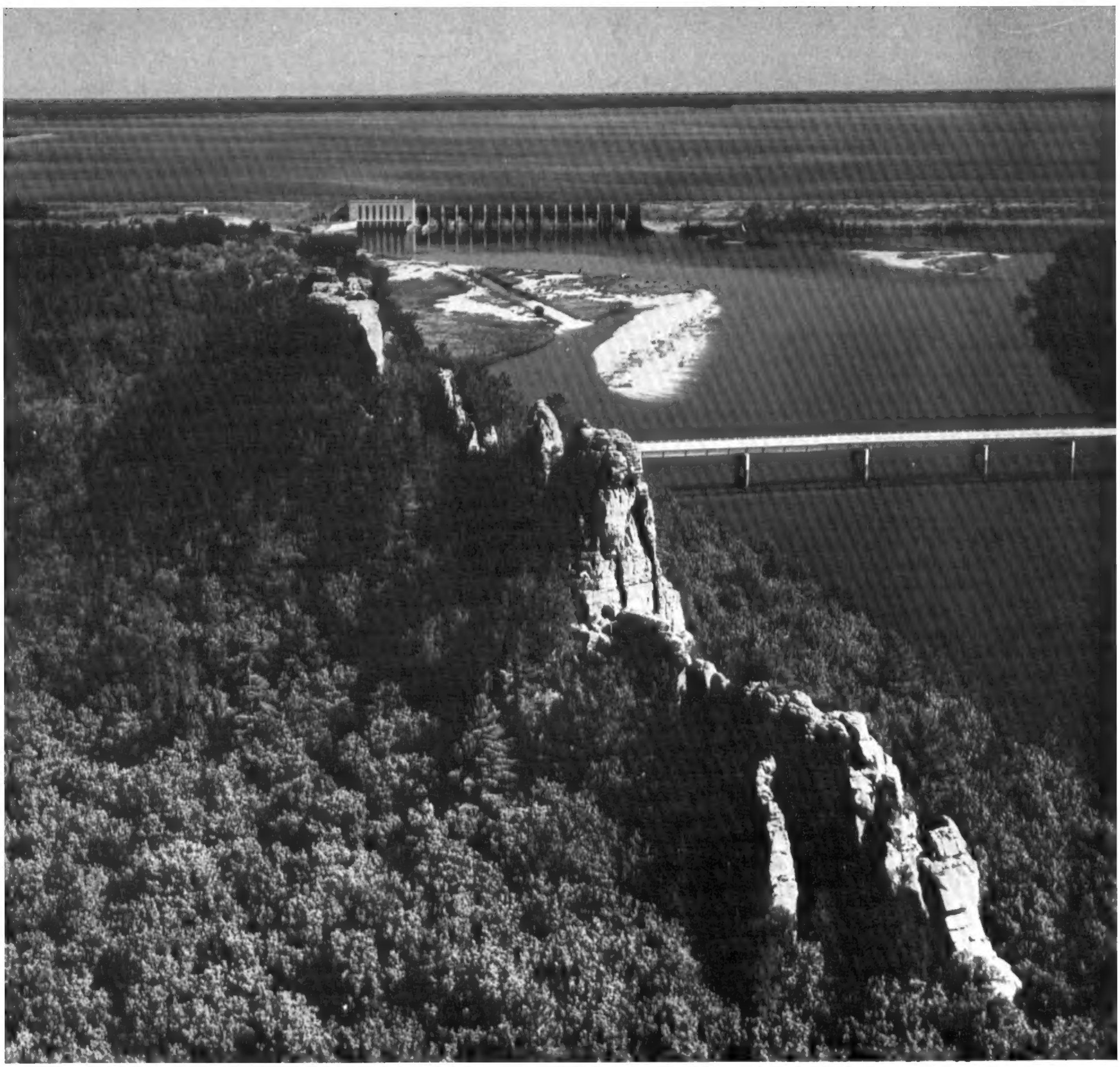
United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
the Research Division of
the College of Agricultural
and Life Sciences,
University of Wisconsin

Soil Survey of Juneau County, Wisconsin



How To Use This Soil Survey

General Soil Map

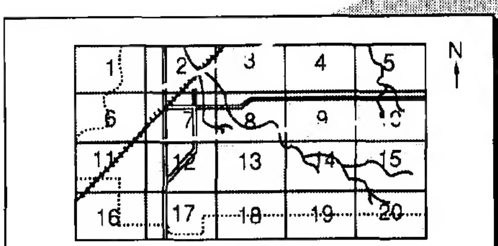
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

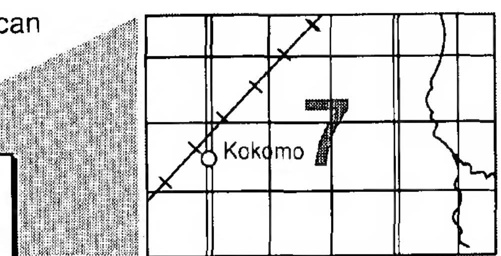
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

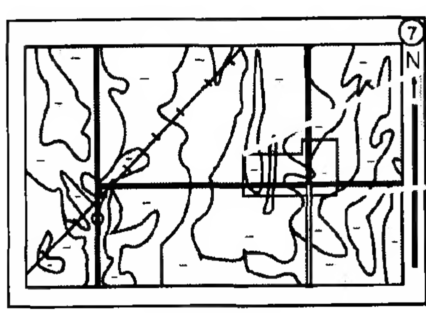


INDEX TO MAP SHEETS



MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



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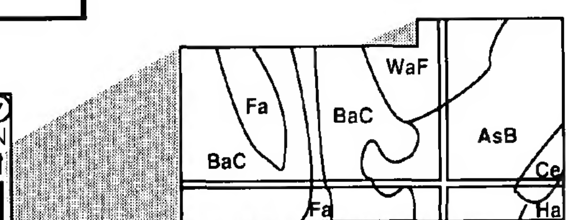

AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1987. Soil names and descriptions were approved in 1987. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1987. This survey was made cooperatively by the Soil Conservation Service and the Research Division of the College of Agricultural and Life Sciences, University of Wisconsin. It is part of the technical assistance furnished to the Juneau County Land Conservation Committee, which helped finance the fieldwork.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Petenwell Rock, a landmark of local importance in Juneau County. In the background is Petenwell Lake.

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Issued January 1991

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Foreword

This soil survey contains information that can be used in land-planning programs in Juneau County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Duane L. Johnson
State Conservationist
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Soil Survey of
Juneau County, Wisconsin

By Howard F. Gundlach, Randall R. Gilbertson, Richard M. Johannes, and Theron A. Meyer III, Soil Conservation Service

Fieldwork by Randall R. Gilbertson, Howard F. Gundlach, Richard M. Johannes, and Theron A. Meyer III, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with
the Research Division of the College of Agricultural and Life Sciences, University of Wisconsin

JUNEAU COUNTY is in the south-central part of Wisconsin (*fig. 1*). The county has a total area of 514,752 acres, including 18,900 acres of water. It is about 26 miles east to west at the widest part but narrows to about 13.5 miles at one point. It is about 42 miles north to south. Juneau County is bordered on the north by Wood County; on the west by Jackson, Monroe, and Vernon Counties; and on the south by Sauk County. The Wisconsin River forms the eastern boundary of Juneau County and separates it from Adams County.

Mauston, in the south-central part of the county, is the county seat. In 1980, it had a population of 3,284. In the same year, the county had a population of 21,039. At that time, 85 percent of the population was rural.

A soil survey of Juneau County was made in about 1911 by the U.S. Department of Agriculture's Bureau of Soils and the Wisconsin Geological and Natural History Survey. Each agency published a separate report. The Bureau of Soils published its survey in 1913 *(6)*, and the Wisconsin Geological and Natural History Survey published in 1914 *(10)*. The present survey updates the earlier ones and provides additional information and larger, more detailed soil maps. The soil names may differ from those in the earlier surveys because of a better knowledge of the soils and changes in soil concepts.

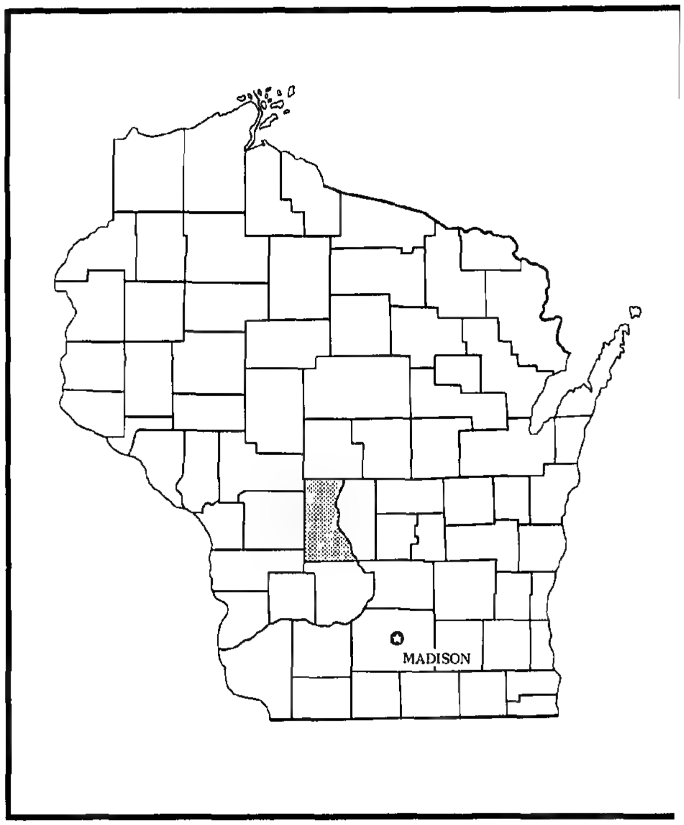

Figure 1.—*Location of Juneau County in Wisconsin.*

General Nature of the County

This section describes some of the physical and cultural characteristics of the county. The geology and underlying material are described under the heading "Formation of the Soils."

History and Development

The area now known as Juneau County was ceded to the United States Government by the Winnebago Indians in 1836. The county is named in honor of Solomon Juneau, an early Wisconsin pioneer and founding father of Milwaukee.

The earliest white man known to have visited the area was John T. de la Ronde, in 1832. He was an attache of the Hudson Bay Company seeking trade with the Indians. The first permanent settlement in the area was in 1837 when de la Ronde established a trading post on the Lemonweir River at the present site of Mauston.

In 1855, Juneau County was created by an act of the state legislature from territory which had been a part of Adams County. The first county seat was at New Lisbon. In 1857, the county seat was moved to Mauston by public referendum.

Agriculture was first practiced to a limited degree by the Winnebago and Menominee Indians. As the logging industry removed the forests, more permanent agriculture began to develop. After about 1850, farming increased and settlement was rapid.

Agriculture developed first in the more fertile areas of the Lemonweir Valley and the unglaciated hills of the southwestern part of the county. Both settlement and agriculture lagged behind in northern Juneau County because of unfavorable soil conditions. Farming is still the dominant land use in the southern half of the county. Forestry, recreation, and wildlife management are the principal land uses in most of the northern half of the county. Since 1965, however, more than 8,300 acres has been cleared of trees in the northeast corner of the county and is used for irrigated cropland. About 4,000 of these acres has been cleared since 1978.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

Winters in Juneau County are very cold, and the short summers are fairly warm. The common crops are corn, soybeans, small grain, forage, and suitable vegetables and specialty crops. Precipitation is fairly well distributed throughout the year, reaching a slight peak in summer. Snow generally covers the ground much of the time from late fall through early spring.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Mauston in the period 1951 to 1981. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 19 degrees F and the average daily minimum temperature is 8 degrees. The lowest temperature on record, which occurred at Mauston on January 15, 1963, is -36 degrees. In summer, the average temperature is 69 degrees and the average daily maximum temperature is 82 degrees. The highest recorded temperature, which occurred at Mauston on August 21, 1955, is 102 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 33 inches. Of this, nearly 23 inches, or about 70 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 18 inches. The heaviest 1-day rainfall during the period of record was 3.78 inches at Mauston on August 1, 1953. Thunderstorms occur on about 41 days each year.

The average seasonal snowfall is about 52 inches. The greatest snow depth at any one time during the period of record was 31 inches. On the average, 48 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 65 percent of the time possible in summer and 45 percent in winter. The prevailing wind is southerly in summer and westerly in winter. Average windspeed is highest, 10 miles per hour, in spring.

Physiography, Relief, and Drainage

Juneau County is in two major physiographic provinces with distinct characteristics: the Central Plain and the Western Upland.

The northeastern three-fourths of the county is part

of the Central Plain. This part of the county is a broad glacial lake basin and generally has flat or gently undulating topography, except for an occasional sandstone butte. These buttes rise above the basin to a height mainly of 100 to 300 feet and have a maximum elevation of 1,262 feet, at Sheep Pasture Bluff. They are capped by resistant rock and are remnant outliers of the retreating uplands to the southwest. The lake basin slopes gradually to the southeast. Elevations range from about 980 feet in the northwest corner of the county to about 840 feet in the southeast, at the Wisconsin River. The lake basin has extensive areas of wetlands, which result from flat topography, a high water table, and slowly permeable layers of silt or clay within the lake deposits. The surface drainage is toward the Wisconsin River. The Lemonweir, Little Yellow, and Yellow Rivers flow through and drain most of the lake basin. The Lemonweir River has a modified dendritic drainage pattern. The Little Yellow and Yellow Rivers have a more linear pattern.

The southwestern one-fourth of the county is part of the Western Uplands. This unglaciated upland is a thoroughly dissected, hilly area. Steep sandstone escarpments mark the northern and eastern boundaries. At the higher elevations are remnants of the more resistant dolomite bedrock which capped these uplands. The valleys, incised 200 to 350 feet below the ridgetops, are long and V-shaped and have relatively narrow bottoms. The highest elevation is 1,380 feet, at Johnson Hill in Plymouth Township. The drainage pattern is dendritic, and most of the area is well drained. All parts of this upland area are drained by streams within the Wisconsin River drainage basin. The Baraboo River is the major tributary in this area.

Water Supply

The many streams, rivers, and flowages in Juneau County furnish an abundant supply of surface water. The main uses of surface water are power generation, irrigation, recreation, fish and wildlife habitat, and disposal of effluent from sewage treatment plants. For most users, however, ground water is the major source of supply. In Juneau County, ground water is readily available in quantities adequate to meet domestic, agricultural, municipal, and industrial needs.

Ground water is at various depths, depending upon the general topography, the elevation above the permanent stream level, and the character of the underlying rock formation. It is in aquifers where water fills all pores and fissures in the bedrock or in unconsolidated material, such as sand. Wells drilled into these aquifers are the source of water for rural users. The level of ground water rises and falls from season to season and year to year, depending on rainfall.

Ground water for municipal use in Juneau County is obtained from the Cambrian sandstone aquifer, which underlies the southern half of the county. This aquifer also provides ground water for private water supplies in the southern one-third of the county. This water is suitable for virtually all uses. Yields are as high as 1,850 gallons per minute but range mainly from 150 to 840 gallons per minute *(5)*. The average yield for high-capacity wells is 500 gallons per minute.

Glacial lake and outwash deposits make up an aquifer that is the major source of ground water for private water supplies in the northern two-thirds of the county. This aquifer is thickest, about 50 to 100 feet, along the Wisconsin River from the northern end of Castle Rock Lake to the northern end of Petenwell Lake. In this area yields of about 500 to 1,000 gallons per minute can be expected. Yields of 50 to 500 gallons per minute can be expected in a band several miles wide along the periphery of the high-yield area. In the remainder of the area, this aquifer is less than 50 feet thick and generally produces yields of less than 50 gallons per minute *(3)*.

The quality of ground water in Juneau County is generally good for most domestic, municipal, and industrial uses, but treatment may be necessary for specific purposes. The water is relatively soft in most of the county but becomes fairly hard in the uplands in the southwestern part of the county. Local differences in the quality of ground water are caused by the composition, solubility, and surface area of particles of soil and rock through which the water moves and the length of time the water is in contact with these materials. Calcium, magnesium, and bicarbonate ions derived from dolomite are present. Minor water use problems are caused by hardness and, locally, by high concentrations of iron. Iron is in localized areas and is mainly produced by reducing conditions in marshes and swamps, although some iron is from bedrock.

Transportation and Industry

Three railroads are in Juneau County. Most parts of the county are accessible by hard-surfaced or gravel roads. The Necedah National Wildlife Refuge, the Meadow Valley State Wildlife Area, some areas along the Yellow and Lemonweir Rivers, and some areas in Armenia Township have limited access because of a lack of roads or are seasonally inaccessible because of flooding and other weather-related problems. Interstate

Highway 90-94 is the main east-west transportation route. State Highways 21, 82, and 16 and U.S. Highway 12 are also important east-west roads in the county. State Highways 80 and 58 and County Highway Q are the main north-south roads in the county. Commercial air transportation is available at airports in the vicinity of La Crosse and Madison. Small aircraft are served by the Mauston-New Lisbon Union Airport and by airstrips in Necedah, Union Center, and Wonewoc.

Manufacturing, agriculture, recreation, and forestry are among the major industries in Juneau County. The main manufacturing industries are food products, metalworking, machinery, wood products, transportation equipment, plastic products, gaskets, and electrical equipment.

Mineral production in the county is of minor extent. At two quarries, dolomite limestone bedrock is blasted and is crushed for gravel or ground for agricultural lime (fig. 2). Quartzite bedrock is blasted and crushed for gravel in a quarry at Necedah.

Dairy farming is the major agricultural enterprise. Beef cattle, cranberries, and irrigated vegetable crops are also important.

The lakes and rivers in the county provide opportunities for swimming, fishing, and boating. The Meadow Valley State Wildlife Area and the Necedah National Wildlife Refuge provide wildlife habitat for deer, waterfowl, grouse, turkey, sandhill cranes, and such fur-bearers as muskrat, mink, beaver, and otter. Juneau County has a system of county parks and is the site of Buckhorn State Park and parts of Mill Bluff and Rocky Arbor State Parks. These areas provide a wide variety of scenic, historic, scientific, and natural attractions. Trails for hiking, skiing, and snowmobiling are available, as are camping, fishing, and hunting facilities.

About 252,000 acres, or 51 percent of Juneau County, is woodland. Major species are pine and oak. These woodlands provide pulpwood, lumber, firewood, wildlife habitat, and recreation. Some areas have been planted to conifers, such as Scotch pine, red pine, white pine, and several species of fir. These conifers are harvested as Christmas trees.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, soil reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for

Figure 2.—Creviced dolomite exposed in a quarry.

laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot

experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The general soil map units in Juneau County join with similar map units that may have different names in adjacent counties. These differences result from variations in the extent or pattern of the soils in the counties. The differences do not significantly affect the use of the maps for general planning.

Soil Descriptions

1. Newson-Meehan-Dawson Association

Deep, nearly level and gently sloping, somewhat poorly drained to very poorly drained, sandy and mucky soils; on outwash plains, on stream terraces, and in basins of glacial lakes

This association is on low flats, in drainageways and depressions, and on concave foot slopes (fig. 3). It makes up about 32 percent of the county. It is about 46 percent Newson soils, 28 percent Meehan soils, 13 percent Dawson soils, and 13 percent soils of minor extent.

Newson soils are nearly level and are poorly drained and very poorly drained. Permeability is rapid, and available water capacity is low. Typically, the surface layer is black mucky loamy sand about 3 inches thick. The subsurface layer is black, very friable loamy sand about 5 inches thick. The subsoil is about 14 inches thick. It is dark grayish brown, mottled, very friable sand in the upper part and grayish brown, mottled, loose sand in the lower part. The substratum to a depth of about 60 inches is yellowish brown, mottled, loose sand.

Meehan soils are nearly level and gently sloping and are somewhat poorly drained. Permeability is rapid, and available water capacity is low. Typically, the surface layer is very dark grayish brown sand about 4 inches thick. The subsoil is dark yellowish brown and brown, mottled, very friable sand about 25 inches thick. The substratum to a depth of about 60 inches is light yellowish brown, mottled, loose sand.

Dawson soils are nearly level and very poorly drained. Permeability is moderately slow to moderately rapid in the organic layer and rapid in the substratum. Available water capacity is very high. Typically, the organic layer is black and very dark brown muck about 37 inches thick. The substratum to a depth of about 60 inches is dark grayish brown, loose sand.

Some of the minor soils in this association are the Algansee, Friendship, Glendora, Loxley, and Plainfield soils. The somewhat poorly drained Algansee soils and the poorly drained and very poorly drained Glendora soils formed in a thin layer of loamy alluvium underlain by fine sand alluvium. They are on flood plains. The moderately well drained Friendship soils and the excessively drained Plainfield soils formed in sandy deposits on flats and convex side slopes. The very poorly drained Loxley soils formed in thick accumulations of organic material on low flats and in drainageways and depressions.

Most areas of this association are used as native woodland or support wetland vegetation. Many areas which were drained and cultivated in the past now support native vegetation or have been planted to pine. The problems in managing forest are the sandy soil texture, the water table, and competing vegetation.

A few areas have been drained and are used for

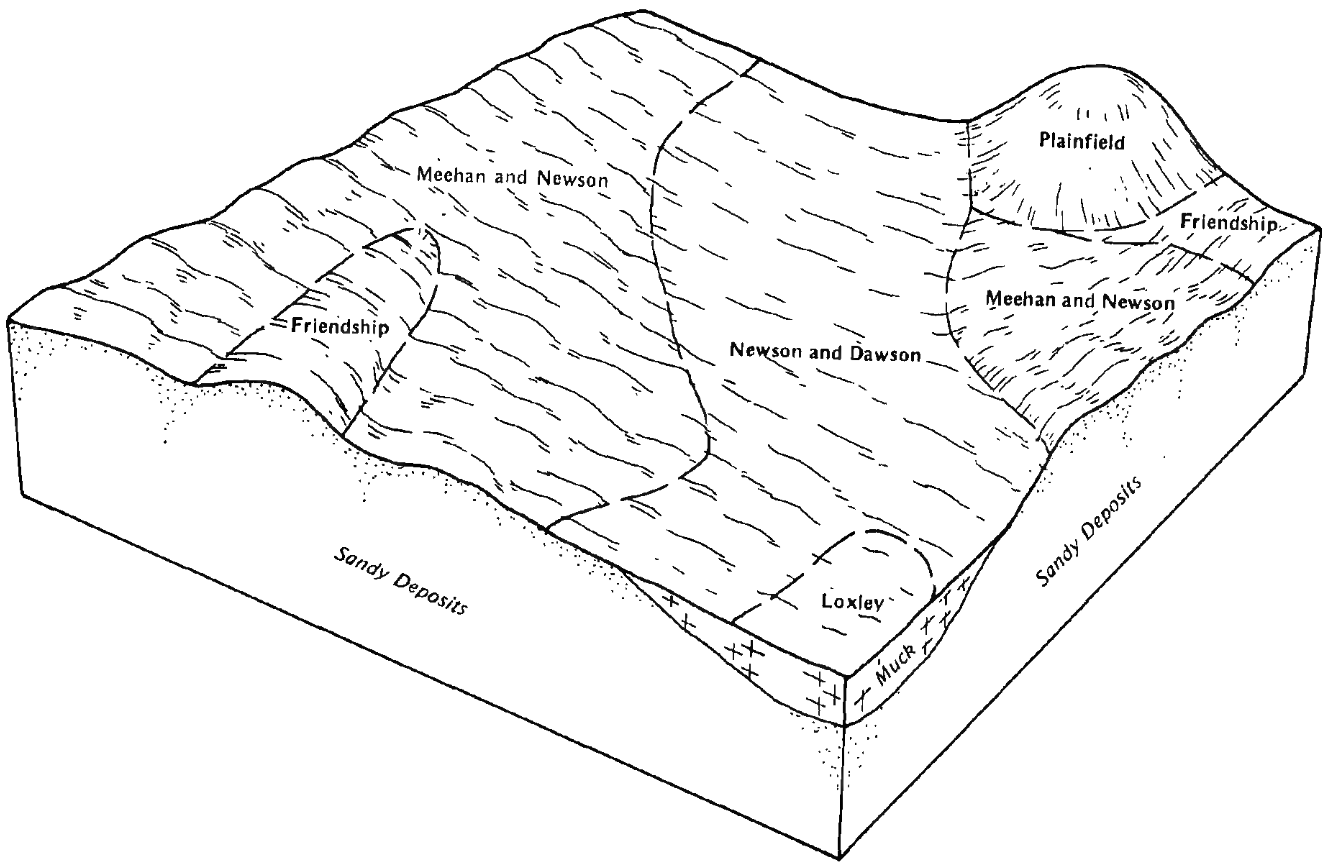

Figure 3.—Typical pattern of soils and parent material in the Newson-Meehan-Dawson association.

crops. Some areas are used for unimproved pasture, and some are used for cranberry bogs. If these soils are drained, crop yields are limited by the low available water capacity. Frost and soil blowing are the main hazards. If used for crops, some areas of the Newson soils also require protection from flooding.

The major soils in this association are generally unsuitable as sites for residential development because of the water table, subsidence in the Dawson soils, and flooding in some areas of the Newson soils.

2. Friendship-Plainfield Association

Deep, nearly level to moderately steep, excessively drained and moderately well drained, sandy soils; on outwash plains, on stream terraces, and in basins of glacial lakes

This association is on flats and convex side slopes. It makes up about 15 percent of the county. It is about 55 percent Friendship soils, 35 percent Plainfield soils, and 10 percent soils of minor extent.

Friendship soils are nearly level and gently sloping and are moderately well drained. Permeability is rapid, and available water capacity is low. Typically, the surface layer is black sand about 2 inches thick. The subsoil is brown and dark yellowish brown, very friable sand about 27 inches thick. The substratum to a depth of about 60 inches is yellowish brown and dark yellowish brown, mottled, loose sand.

Plainfield soils are nearly level to moderately steep and are excessively drained. Permeability is rapid, and available water capacity is low. Typically, the surface layer is very dark grayish brown sand about 8 inches thick. The subsoil is dark yellowish brown, very friable sand about 14 inches thick. The substratum to a depth of about 60 inches is yellowish brown and light yellowish brown, loose sand.

Some of the minor soils in this association are the Algansee, Billett, Glendora, Meehan, Newson, and Roby soils. The somewhat poorly drained Algansee

Figure 4.—Soil blowing in a recently plowed area of Plainfield sand, 1 to 6 percent slopes.

soils and the poorly drained and very poorly drained Glendora soils formed in a thin layer of loamy alluvium underlain by fine sand alluvium. They are on flood plains. The well drained and moderately well drained Billett soils formed dominantly in loamy deposits underlain by sandy deposits. They are on flats and convex side slopes. The somewhat poorly drained Meehan soils formed in sandy deposits on low flats, in drainageways and depressions, and on concave foot slopes. The poorly drained and very poorly drained Newson soils formed in sandy deposits on low flats and in drainageways and depressions. The somewhat poorly drained Roby soils formed in loamy deposits underlain by stratified loamy and sandy deposits. They are on low flats, in drainageways and depressions, and on concave foot slopes.

Some areas of this association are used for crops. Soil blowing is the main hazard affecting crop production (fig. 4). Crop yields are limited by the low available water capacity. The major soils are suited to sprinkler irrigation, which can improve productivity.

Some areas are used as native woodland, and some

have been planted to pine. The main problem in managing forest is the sandy soil texture.

Friendship soils are poorly suited to septic tank absorption fields and only moderately suited to dwellings with basements because of the water table. Moderately steep areas of the Plainfield soils are poorly suited to residential development because of the slope. Nearly level to sloping areas of the Plainfield soils readily absorb but do not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity can result in the pollution of ground water.

3. Algansee-Glendora Association

Deep, nearly level and gently sloping, somewhat poorly drained to very poorly drained, loamy soils; on flood plains

This association makes up about 5 percent of the county. It is about 45 percent Algansee soils, 36 percent Glendora soils, and 19 percent soils of minor extent.

Algansee soils are nearly level and gently sloping and are somewhat poorly drained. Permeability is rapid, and available water capacity is low. Typically, the surface layer is very dark grayish brown fine sandy loam about 5 inches thick. The substratum to a depth of about 60 inches is dark yellowish brown and light yellowish brown, mottled, loose fine sand.

Glendora soils are nearly level and are poorly drained and very poorly drained. Permeability is rapid, and available water capacity is low. Typically, the surface layer is black fine sandy loam about 7 inches thick. The substratum to a depth of about 60 inches is grayish brown and gray, mottled, loose fine sand.

Some of the minor soils in this association are the Dawson, Friendship, Lows, Loxley, and Roby soils. The very poorly drained Dawson soils formed in organic material underlain by sandy deposits. They are on low flats and in drainageways and depressions. The moderately well drained Friendship soils formed in sandy deposits on flats and convex side slopes. The poorly drained Lows soils formed in loamy deposits over sandy deposits. They are on low flats and in drainageways and depressions. The very poorly drained Loxley soils formed in thick accumulations of organic material on low flats and in drainageways and depressions. The somewhat poorly drained Roby soils formed in loamy deposits underlain by stratified sandy and loamy deposits. They are on low flats, in drainageways and depressions, and on concave foot slopes.

Most areas of this association are used as native woodland. Some are used as unimproved pasture. The main problems in managing forest are the sandy soil texture, flooding, the water table in the Glendora soils, and competing vegetation.

The major soils in this association are generally unsuitable for crops and as sites for residential development because of flooding and the water table.

4. Poygan-Wyeville-Wautoma Association

Deep, nearly level and gently sloping, somewhat poorly drained to very poorly drained, sandy and silty soils; on stream terraces and lake terraces

This association is on low flats, in drainageways and depressions, and on concave foot slopes. It makes up about 9 percent of the county. It is about 26 percent Poygan and similar soils, 22 percent Wyeville and similar soils, 18 percent Wautoma and similar soils, and 34 percent soils of minor extent.

Poygan soils are nearly level and are poorly drained. Permeability is slow, and available water capacity is moderate. Typically, the surface layer is black silt loam about 8 inches thick. The subsoil is dark grayish brown and reddish brown, mottled, firm silty clay about 15 inches thick. The substratum to a depth of about 60 inches is reddish brown, mottled, very firm silty clay.

Wyeville soils are nearly level and gently sloping and are somewhat poorly drained. Permeability is moderately rapid in the sandy upper part and slow or very slow in the clayey lower part. Available water capacity is low. Typically, the surface layer is very dark gray sand about 8 inches thick. The subsoil is about 40 inches thick. It is brown, grayish brown, and light brown, mottled, very friable sand in the upper part and reddish brown, mottled, firm silty clay in the lower part. The substratum to a depth of about 60 inches is mixed reddish brown and light reddish brown, mottled, firm silty clay.

Wautoma soils are nearly level and are poorly drained and very poorly drained. Permeability is moderately rapid or rapid in the sandy upper part and slow or very slow in the clayey lower part. Available water capacity is low. Typically, the surface layer is black loamy sand about 8 inches thick. The subsoil is about 30 inches thick. It is gray, mottled, loose sand in the upper part; gray, mottled, friable loam in the next part; and light gray, mottled, firm silty clay in the lower part. The substratum to a depth of about 60 inches is yellowish red, mottled, firm silty clay.

Some of the minor soils in this association are the Friendship, Palms, and Roby soils. The moderately well drained Friendship soils formed in sandy deposits on

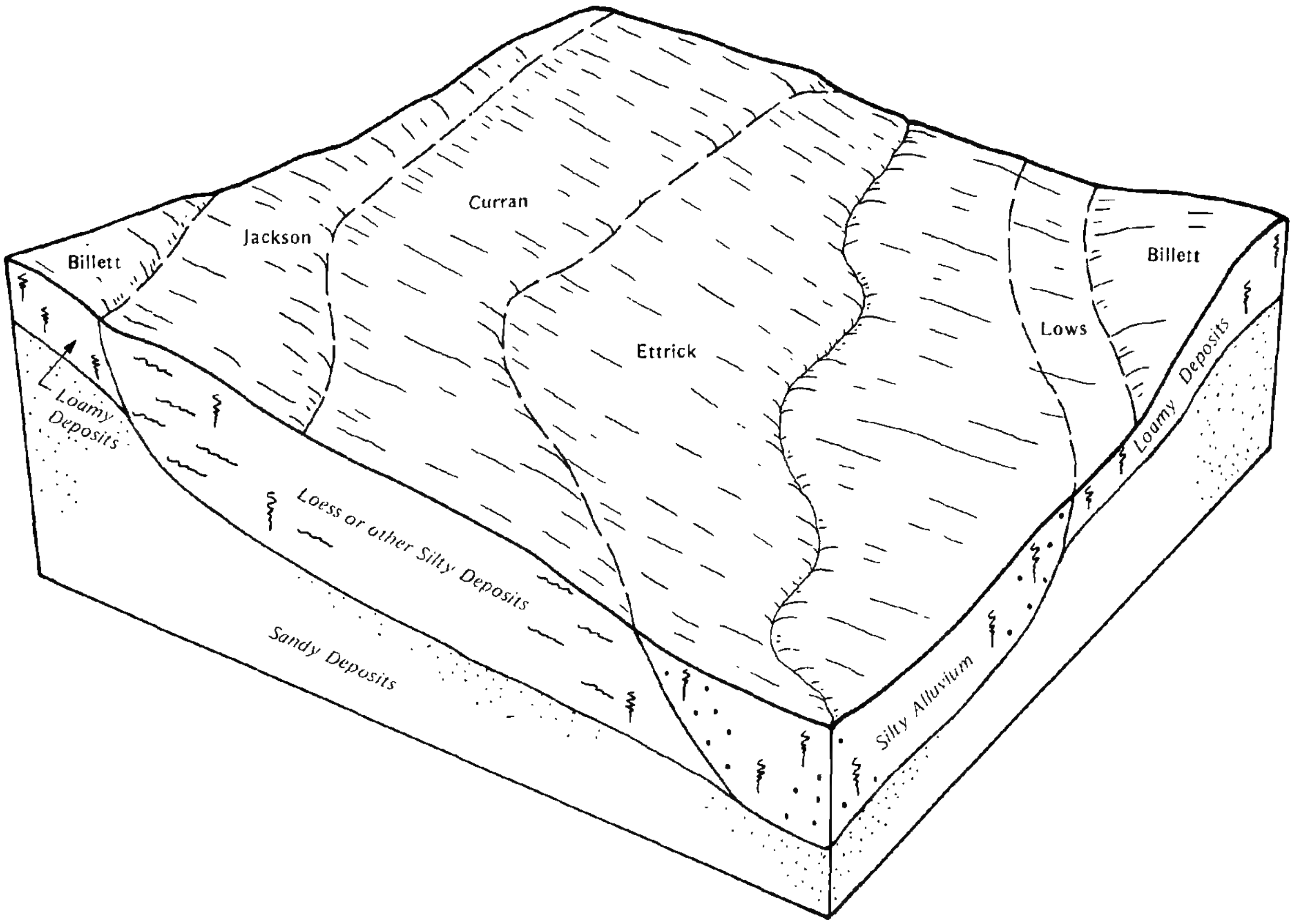

Figure 5.—Typical pattern of soils and parent material in the Ettrick-Curran-Jackson association.

flats and convex side slopes. The very poorly drained Palms soils formed in organic material underlain by silty or loamy deposits. They are on low flats and in drainageways and depressions. The somewhat poorly drained Roby soils formed in loamy deposits underlain by stratified loamy and sandy deposits. They are on low flats, in drainageways and depressions, and on concave foot slopes.

Most areas of this association are drained and are used for crops. A few are used for unimproved pasture. If these soils are drained, crop and forage yields are limited by the low and moderate available water capacity. Soil blowing is a hazard on the Wyeville and Wautoma soils. Flooding is a hazard on the Poygan soils.

Undrained areas support native vegetation. A few of these areas are used as woodland. The main problems in managing forest are the sandy soil texture, the water table, and competing vegetation.

The major soils in this association are generally unsuitable as sites for residential development because of the water table and the slow permeability. Poygan soils are also generally unsuitable because of the shrink-swell potential and flooding.

5. Ettrick-Curran-Jackson Association

Deep, nearly level and gently sloping, moderately well drained to very poorly drained, silty soils; on stream terraces, lake terraces, and flood plains

This association is on low flats, in drainageways and depressions, on flood plains, on concave foot slopes, and on concave or convex side slopes (fig. 5). It makes up about 8 percent of the county. It is about 32 percent

Ettrick and similar soils, 22 percent Curran and similar soils, 14 percent Jackson and similar soils, and 32 percent soils of minor extent.

Ettrick soils are nearly level and are poorly drained and very poorly drained. Permeability is moderately slow in the silty part and moderate or moderately rapid in the sandy part. Available water capacity is very high. Typically, the surface layer is black silt loam about 11 inches thick. The subsoil is about 33 inches thick. It is grayish brown, light olive gray, and olive gray, mottled, firm silt loam in the upper part and light olive gray, mottled, friable silt loam in the lower part. The upper part of the substratum is olive gray, mottled, friable silt loam. The lower part to a depth of about 60 inches is olive gray, mottled, loose loamy fine sand.

Curran soils are nearly level and gently sloping and are somewhat poorly drained. Permeability is moderate in the subsoil and rapid in the substratum. Available water capacity is very high. Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is about 44 inches thick. It is brown, grayish brown, and light brownish gray, mottled, friable silt loam and silty clay loam in the upper part and yellowish brown, mottled, very friable, stratified silt loam, loam, sandy loam, and loamy sand in the lower part. The substratum to a depth of about 60 inches is yellowish brown, loose loamy sand.

Jackson soils are gently sloping and moderately well drained. Permeability is moderate in the subsoil and rapid in the substratum. Available water capacity is high. Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The subsoil is about 47 inches thick. It is brown and dark yellowish brown, friable and firm silt loam in the upper part; dark yellowish brown, mottled, friable silt loam in the next part; and brown, mottled, friable sandy loam in the lower part. The substratum to a depth of about 60 inches is brown, mottled, loose loamy sand.

Some of the minor soils in this association are the Billett, Lows, and Palms soils. The well drained and moderately well drained Billett soils formed dominantly in loamy deposits over sandy deposits. They are on flats and convex side slopes. The poorly drained Lows soils formed in loamy deposits over sand deposits. They are on low flats and in drainageways and depressions. The very poorly drained Palms soils formed in organic material underlain by silty or loamy deposits. They are on low flats and in drainageways and depressions.

Most areas of this association are used for crops, but the cultivated areas of the Ettrick and Curran soils must be drained and protected from flooding.

Some areas are undrained and support native vegetation. A few areas are used as woodland. The main problems in managing forest are the water table and competing vegetation.

The major soils in this association are poorly suited to residential development because of the water table. The Ettrick soils are unsuitable for residential development because of flooding. The areas of the Curran soils that are subject to flooding are also unsuitable.

6. Plainbo-Partridge Association

Moderately deep, nearly level to sloping, excessively drained and somewhat poorly drained, sandy soils; on outwash plains, stream terraces, and uplands

This association is on flats, convex side slopes, and concave foot slopes and in drainageways and depressions. It makes up about 8 percent of the county. It is about 56 percent Plainbo and similar soils, 19 percent Partridge and similar soils, and 25 percent soils of minor extent.

Plainbo soils are nearly level to sloping and are excessively drained. Permeability is rapid, and available water capacity is very low. Typically, the surface layer is black sand about 3 inches thick. The subsoil is about 18 inches thick. It is brown and strong brown, very friable sand in the upper part and brown, very friable fine sand in the lower part. The substratum is yellowish brown, loose fine sand about 3 inches thick. Yellowish brown and very pale brown, partly consolidated sandstone bedrock is at a depth of about 24 inches.

Partridge soils are nearly level and gently sloping and are somewhat poorly drained. Permeability is rapid, and available water capacity is very low. Typically, the surface layer is black loamy fine sand about 3 inches thick. The subsoil is about 13 inches thick. It is dark grayish brown, mottled, very friable loamy fine sand in the upper part and light olive brown, mottled, very friable fine sand in the lower part. The substratum to a depth of about 23 inches is light yellowish brown, mottled, loose fine sand. Dark yellowish brown and brown sandstone bedrock is at a depth of about 23 inches.

Some of the minor soils in this association are the Dawson, Friendship, Newson, and Plainfield soils. The very poorly drained Dawson soils formed in organic material underlain by sandy deposits. They are on low flats and in drainageways and depressions. The moderately well drained Friendship soils formed in sandy deposits on flats and convex side slopes. The poorly drained and very poorly drained Newson soils formed in sandy deposits on low flats and in

drainageways and depressions. The excessively drained Plainfield soils formed in sandy deposits on flats and convex side slopes.

Most areas of this association are used as woodland. Some areas have been planted to pine. The main problems in managing forest are the sandy soil texture and the rooting depth. The water table and competing vegetation are additional problems in the Partridge soils.

A few areas are used for crops or pasture. Plainbo soils and drained areas of Partridge soils have limited crop and forage yields because of the very low available water capacity. Soil blowing is a hazard. These soils are suited to sprinkler irrigation, which can improve productivity.

The major soils in this association are poorly suited to septic tank absorption fields because of the depth to bedrock. They readily absorb but do not adequately filter the effluent. Also, the effluent can seep through cracks in the underlying sandstone. The seepage can result in the pollution of ground water. The Partridge soils are poorly suited to septic tank absorption fields and dwellings because of a perched water table and flooding in some areas.

7. Urne-La Farge-Rozetta Association

Moderately deep and deep, gently sloping to very steep, somewhat excessively drained to moderately well drained, loamy and silty soils; on uplands

This association is on convex ridgetops and side slopes (fig. 6). It makes up about 22 percent of the county. It is about 35 percent Urne and similar soils, 31 percent La Farge and similar soils, 10 percent Rozetta soils, and 24 percent rock outcrop and soils of minor extent.

Urne soils are gently sloping to very steep, moderately deep, and somewhat excessively drained. Permeability is moderately rapid, and available water capacity is low. Typically, the surface layer is dark brown very fine sandy loam about 4 inches thick. The subsoil is very fine sandy loam about 24 inches thick. It is light olive brown and very friable in the upper part and dark yellowish brown and friable in the lower part. Yellowish brown, partly consolidated sandstone bedrock with many grains of grayish green glauconite is at a depth of about 28 inches.

La Farge soils are gently sloping to moderately steep, moderately deep, and well drained. Permeability and available water capacity are moderate. Typically, the surface layer is about 8 inches thick. It is dark grayish brown silt loam that has been mixed with some dark yellowish brown silt loam by plowing. The subsoil is about 28 inches thick. It is dark yellowish brown, firm silt loam in the upper part and dark yellowish brown, friable loam in the lower part. Yellowish brown, partly consolidated sandstone bedrock and layers and grains of grayish green glauconite are at a depth of about 36 inches.

Rozetta soils are gently sloping to moderately steep, deep, and moderately well drained. Permeability is moderate, and available water capacity is very high. Typically, the surface layer is about 9 inches thick. It is dark brown silt loam that has been mixed with some brown silt loam by plowing. The subsoil is about 41 inches thick. It is brown and yellowish brown, friable and firm silt loam in the upper part and yellowish brown, mottled, friable silt loam in the lower part. The substratum to a depth of about 60 inches is yellowish brown, mottled, friable silt loam.

Some of the minor soils in this association are the Boone, Eleva, and Orion soils. Also of minor extent are areas of rock outcrop. The excessively drained, moderately deep Boone soils formed in sandy material weathered from the underlying sandstone bedrock. They are on convex ridges and side slopes. The somewhat excessively drained Eleva soils formed in loamy deposits or in loamy material weathered from sandstone bedrock. They are on convex ridges and side slopes. The somewhat poorly drained Orion soils formed in silty alluvium on flood plains. The rock outcrop is sandstone on convex side slopes.

Most areas of the gently sloping to moderately steep soils in this association are used for crops or pasture. Water erosion is the main hazard. Soil blowing is a hazard on the Urne soils. Crop and forage yields are limited on the Urne and La Farge soils because of the low or moderate available water capacity.

Most of the steep and very steep areas of Urne soils are used as pasture or woodland. The main problems in managing forest are slope, rooting depth, and competing vegetation.

The La Farge and Urne soils are poorly suited to septic tank absorption fields because of the depth to bedrock. The effluent can seep through cracks in the underlying sandstone. The seepage can result in the pollution of ground water. The gently sloping and sloping Rozetta soils are only moderately suited to septic tank absorption fields and to dwellings with basements because of a perched water table. The moderately steep to very steep soils are poorly suited to dwellings because of the slope.

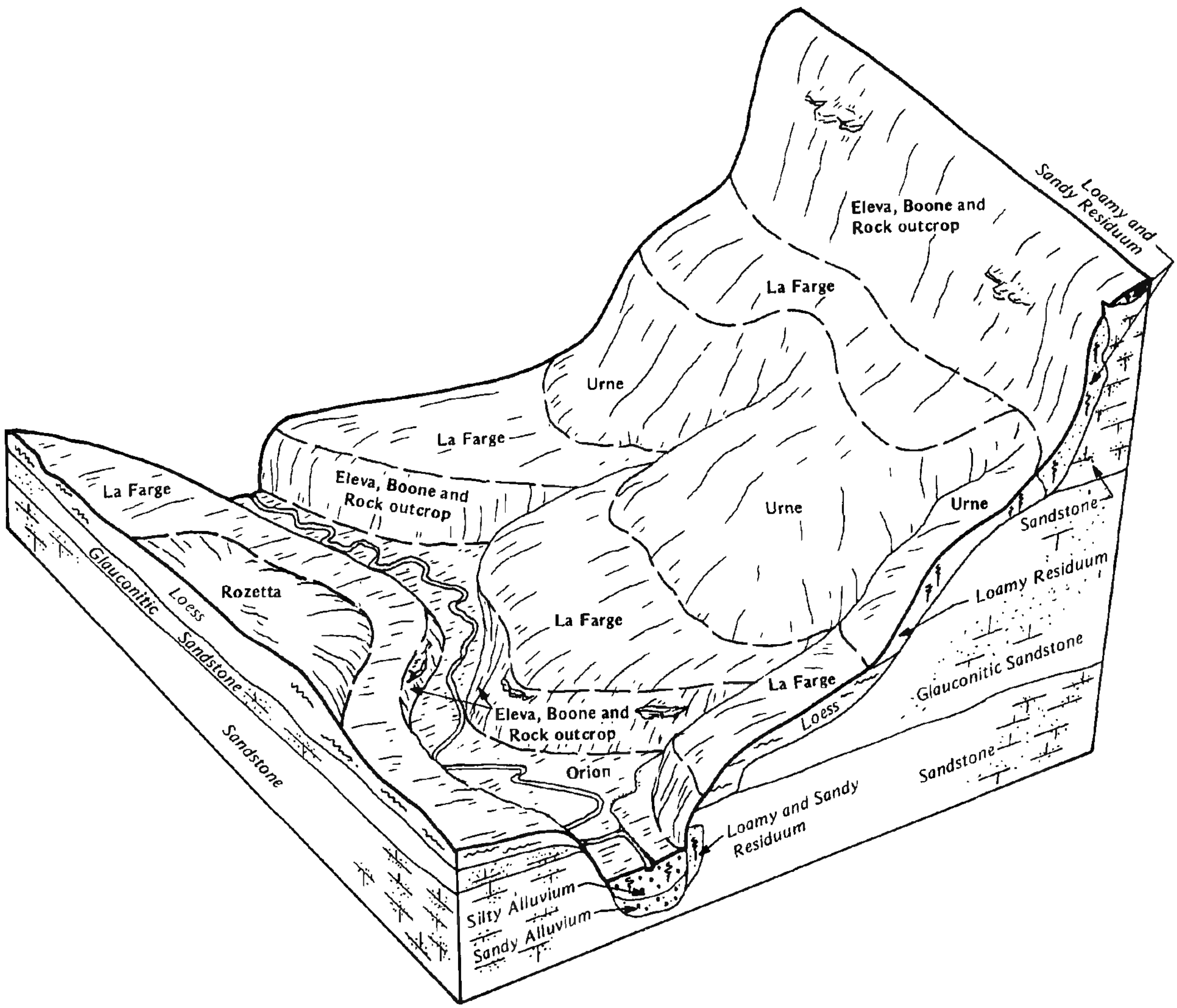

Figure 6.—Typical pattern of soils and parent material in the Urne-La Farge-Rozetta association.

8. Wildale-NewGlarus-Reedsburg Association

Deep and moderately deep, gently sloping and sloping, well drained and somewhat poorly drained, silty soils; on uplands

This association is on convex ridgetops. It makes up about 1 percent of the county. It is about 42 percent Wildale soils, 18 percent NewGlarus soils, 5 percent Reedsburg soils, and 35 percent soils of minor extent.

Wildale soils are gently sloping and sloping, deep, and well drained. Permeability is slow, and available water capacity is moderate. Typically, the surface layer is dark brown cherty silt loam about 9 inches thick. The upper part of the subsoil is dark red, very firm cherty clay. The next part is brown and dark red, very firm clay. The lower part to a depth of about 60 inches is red, very firm clay.

NewGlarus soils are gently sloping and sloping,

moderately deep, and well drained. Permeability is moderate or moderately slow in the silty upper part of the subsoil and slow in the clayey residuum. Available water capacity is moderate. Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil is about 30 inches thick. It is dark yellowish brown, firm silt loam and silty clay loam in the upper part and dark yellowish brown, dark brown, and yellowish red, very firm silty clay in the lower part. Light yellowish brown dolomite bedrock is at a depth of about 38 inches.

Reedsburg soils are gently sloping, deep, and somewhat poorly drained. Permeability is moderate in the silty upper part and slow in the clayey lower part. Available water capacity is moderate. Typically, the surface layer is dark brown silt loam about 9 inches thick. The upper part of the subsoil is yellowish brown, mottled, friable silt loam. The next part is brown, mottled, very firm cherty silty clay. The lower part to a depth of about 60 inches is strong brown, mottled, very firm cherty clay.

Some of the minor soils in this association are the Boone, Eleva, La Farge, and Urne soils. Also of minor extent are areas of rock outcrop. The excessively drained, moderately deep Boone soils formed in sandy material weathered from the underlying sandstone bedrock. They are on very steep, convex side slopes. The somewhat excessively drained, moderately deep Eleva soils formed in loamy deposits or in loamy material weathered from sandstone bedrock. They are on very steep, convex side slopes. The well drained, moderately deep La Farge soils formed dominantly in loess underlain by glauconitic sandstone bedrock. They are on convex side slopes. The somewhat excessively drained, moderately deep Urne soils formed in loamy material weathered from the underlying glauconitic sandstone bedrock. The rock outcrop is sandstone on convex side slopes.

Most areas of this association are used for crops or pasture. Water erosion is the main hazard. During dry years, crop and forage yields are somewhat limited by the moderate available water capacity.

Some areas are used as woodland. The problems in managing forest are rooting depth and competing vegetation. Also, the clayey texture limits planting and harvesting on the Wildale soils.

The major soils in this association are poorly suited to septic tank absorption fields because of the slow permeability. The NewGlarus soils are also poorly suited to septic tank absorption fields because of the depth to bedrock and the Reedsburg soils because of a perched water table. The Wildale soils are poorly suited to dwellings because of the shrink-swell potential, and the Reedsburg soils are poorly suited because of the perched water table. The Reedsburg soils are poorly suited to dwellings with basements because of the shrink-swell potential.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Plainfield sand, 1 to 6 percent slopes, is a phase of the Plainfield series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Meehan-Newson complex, 0 to 3 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

The detailed soil map units in Juneau County join with similar map units that may have different names in adjacent counties. These differences result partly from variations in the extent and pattern of the soils in the counties. Some of the names are different because small map units in adjacent counties join large soil complexes in Juneau County. These differences do not significantly affect the use of the detailed soil maps.

Soil scientists were denied access to a few tracts in the county. These areas were mapped by using knowledge of the surrounding area and by aerial photo interpretation. Delineations portraying soil boundaries are less accurately drawn on these tracts than where soil scientists had access to the land and could examine the soil.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

AgA—Algansee-Glendora fine sandy loams, 0 to 3 percent slopes. These soils are on flood plains. The Algansee soil is deep, nearly level and gently sloping, and somewhat poorly drained. The Glendora soil is deep, nearly level, and poorly drained and very poorly drained. Both soils are subject to frequent flooding

Figure 7.—Spring flooding in an area of Algansee-Glendora fine sandy loams, 0 to 3 percent slopes, along the Lemonweir River.

(fig. 7). Individual areas mainly are elongated and range from 3 to 400 acres in size. They are 45 to 55 percent Algansee soil and 35 to 45 percent Glendora soil. The two soils occur as areas so intricately intermingled or so small that mapping them separately was not practical at the scale used.

Typically, the Algansee soil has a surface layer of very dark grayish brown fine sandy loam about 5 inches thick. The substratum to a depth of about 60 inches is dark yellowish brown and light yellowish brown, mottled, loose fine sand. In some areas the surface layer is silt loam, loam, loamy fine sand, or fine sand. In other areas the slope is more than 3 percent. In some places the substratum has thin strata of silty clay loam, silt loam, loam, or sandy loam. In other places it is coarse sand.

Typically, the Glendora soil has a surface layer of black fine sandy loam about 7 inches thick. The substratum to a depth of about 60 inches is grayish brown and gray, mottled, loose fine sand. In some areas the surface layer is silt loam, loam, loamy fine sand, or fine sand. In other areas the slope is more than 2 percent. In some places the soil has an organic surface layer as much as 15 inches thick. In other places the substratum has thin strata of silty clay loam, silt loam, loam, or sandy loam. In some areas it is coarse sand.

Included with these soils in mapping are small areas of Dawson and Lows soils. These included soils are lower on the landscape than the Algansee soil. They are in landscape positions similar to those of the Glendora soil. The very poorly drained Dawson soils have an organic layer 16 to 51 inches thick. The poorly drained Lows soils have less sand and more silt and clay than the Algansee and Glendora soils. Also included are small areas of water in abandoned stream channels and small areas where the seasonal high water table is below a depth of 3 feet. Inclusions make up 10 to 15 percent of individual mapped areas.

Permeability is rapid in the Algansee and Glendora soils. Available water capacity is low. In undrained areas the seasonal high water table is 1 to 2 feet below the surface of the Algansee soil and is at or near the surface of the Glendora soil much of the year. The depth of root penetration is limited by the water table.

Most areas are undrained. They are used as native woodland and provide habitat for wildlife. Some areas are used as unimproved pasture.

These soils are generally unsuitable for cultivated crops and most forage species because of the water table and the flooding. Most areas cannot be drained or protected from flooding. In the pastured areas, overgrazing can deplete the plant cover and thus result in water erosion during periods of overflow and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

These soils are suited to trees. The problems in managing forest are the sandy soil texture, flooding, the water table in the Glendora soil, and competing vegetation. Planting and harvesting with wheel-type tractors is limited by the sandy substratum and periods of flooding. On the Glendora soil, wetness during the planting season generally limits reforestation to natural regeneration and harvesting is frequently limited to periods when the soil is frozen. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

These soils are unsuitable as sites for septic tank absorption fields because of the water table, the flooding, and the rapid permeability. They are unsuitable as sites for dwellings because of the water table and the flooding. Overcoming these limitations is difficult.

These soils are poorly suited to local roads and streets because of the flooding on both soils and the water table in the Glendora soil. Building the roads on raised fill material and installing large culverts help to prevent the damage caused by flooding and wetness.

The land capability classification is Vlw in nonirrigated areas. The woodland ordination symbol of the Algansee soil is 4W, and that of the Glendora soil is 3W.

BlB—Billett sandy loam, 1 to 6 percent slopes. This deep, nearly level and gently sloping, well drained soil is on flats and the convex side slopes of stream terraces. Most areas are irregular in shape and range from 3 to 65 acres in size.

Typically, the surface layer is dark brown sandy loam about 7 inches thick. The subsoil is about 26 inches thick. It is brown, friable sandy loam in the upper part and strong brown, very friable sand in the lower part. The substratum to a depth of about 60 inches is yellowish brown and light yellowish brown, loose sand. Some areas are eroded. Some small areas have slopes of less than 1 percent or more than 6 percent. In some places the surface layer is loam or loamy sand. In other places the substratum has thin strata of sandy loam or loam. In some areas the content of gravel is as much as 35 percent.

Included with this soil in mapping are small areas of the Friendship soils that have a loamy substratum and small areas of Meridian and Plainfield soils. The moderately well drained Friendship soils are in positions on the landscape similar to or slightly lower than those of the Billett soil. They have 40 to 54 inches of sandy deposits underlain by stratified, loamy deposits. The well drained Meridian soils and the excessively drained Plainfield soils are in positions on the landscape similar to those of the Billett soil. Meridian soils have more clay and less sand in the subsoil than the Billett soil. Plainfield soils are sandy throughout. Also included are small areas that are underlain by clayey deposits below a depth of 20 inches, small severely eroded areas, and

small areas that are moderately well drained. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderately rapid in the Billett soil. Available water capacity is low. The depth of root penetration is limited by the droughtiness of the underlying sand. Organic matter content is moderately low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used for crops or pasture. Some small areas are used as native woodland and provide habitat for wildlife. Others are planted to pine.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During most years, however, crop yields are limited by the low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. If the soil is cultivated, the hazard of water erosion is slight or moderate. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years, forage yields are limited by the low available water capacity. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil readily absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity can result in the pollution of ground water. The soil is suited to dwellings. It is only moderately suited to local roads and streets because of the potential for frost action. This limitation can be overcome by covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel.

The land capability classification is IIe in irrigated areas and IIIs in nonirrigated areas. The woodland ordination symbol is 4A.

BlC2—Billett sandy loam, 6 to 12 percent slopes, eroded. This deep, sloping, well drained soil is on the convex side slopes of stream terraces. Most areas are irregular in shape and range from 3 to 25 acres in size.

In most cultivated areas, some of the original surface layer has been removed through water erosion. Typically, the remaining surface layer is about 8 inches thick. It is dark brown sandy loam that has been intermingled with some dark yellowish brown sandy loam by plowing. The subsoil is about 30 inches thick. It is dark yellowish brown and yellowish brown, very friable sandy loam in the upper part and yellowish brown, very friable loamy sand in the lower part. The upper part of the substratum is yellowish brown, loose fine sand. The lower part to a depth of about 60 inches is light yellowish brown, loose sand. In some areas the surface layer is loam or loamy sand. Some small areas are uneroded. Some have slopes of less than 6 percent or more than 12 percent. In some places the substratum has thin strata of sandy loam or loam. In other places the content of gravel is as much as 35 percent.

Included with this soil in mapping are small areas of the excessively drained Plainfield soils. These soils are in positions on the landscape similar to those of the Billett soil. They are sandy throughout. Also included are small severely eroded areas of Billett sandy loam, areas which are moderately well drained, small areas underlain by clayey deposits below a depth of 20 inches, and areas that have more clay and less sand in the subsoil than this eroded Billett soil. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderately rapid in the Billett soil. Available water capacity is low. The depth of root penetration is limited by the droughtiness of the underlying sand. Organic matter content is moderately low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used for crops or pasture. Some small areas are used as native woodland and provide habitat for wildlife. Others are planted to pine.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During most years, however, crop yields are limited by the low available water capacity. The available water capacity and the depth of root penetration have been reduced by water erosion in most cultivated areas. The soil is suited to sprinkler irrigation, which can improve

productivity. If the soil is cultivated, further water erosion is a moderate hazard. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years, forage yields are limited by the low available water capacity. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil readily absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity can result in the pollution of ground water.

This soil is only moderately suited to dwellings and to local roads and streets because of the slope. Another limitation on sites for local roads and streets is the potential for frost action. The buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas. Building the roads and streets on the contour or cutting and filling help to overcome the slope. Frost action can be controlled by covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel.

The land capability classification is IIIe in irrigated and nonirrigated areas. The woodland ordination symbol is 4A.

BmB—Billett sandy loam, moderately well drained, 1 to 6 percent slopes. This deep, nearly level and gently sloping soil is on flats and the convex side slopes of stream terraces. Most areas are irregular in shape and range from 3 to 130 acres in size.

Typically, the surface layer is very dark grayish brown sandy loam about 9 inches thick. The subsoil is about 27 inches thick. It is brown and dark yellowish brown, friable sandy loam in the upper part and yellowish brown, very friable sand in the lower part. The substratum to a depth of about 60 inches is light yellowish brown, mottled, loose sand that has thin strata of sandy loam. Some small areas are eroded. Some have slopes of less than 1 percent or more than 6 percent. In places the surface layer is loam or loamy sand.

Included with this soil in mapping are small areas of the Friendship soils that have a loamy substratum and small areas of Meridian and Roby soils. The moderately well drained Friendship soils are in positions on the landscape similar to those of the Billett soil. They have 40 to 54 inches of sandy deposits underlain by stratified, loamy deposits. The well drained Meridian soils are in the slightly higher landscape positions. They have more clay and less sand in the subsoil than the Billett soil. The somewhat poorly drained Roby soils are lower on the landscape than the Billett soil. Also included are small severely eroded areas where the soil is well drained and small areas underlain by clayey deposits below a depth of 20 inches. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderately rapid in the Billett soil. Available water capacity is low. The depth of root penetration is limited by the droughtiness of the underlying sand. The seasonal high water table is 3 to 6 feet below the surface during wet periods. Organic matter content is moderately low in the surface layer. This layer is friable and can be easily tilled.

Most areas are used for crops or pasture. Some areas are used as native woodland and provide habitat for wildlife. Some are planted to pine.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During most years, however, crop yields are limited by the low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. If the soil is cultivated, the hazard of water erosion is slight or moderate. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years forage yields are limited by the low available water capacity. Overgrazing depletes the plant cover

and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields in some areas because of the water table. This limitation can be overcome by constructing a mound of suitable filtering material. The soil is suited to dwellings without basements. It is only moderately suited to dwellings with basements because of the water table. This limitation can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness.

This soil is only moderately suited to local roads and streets because of the potential for frost action. This limitation can be overcome by covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel.

The land capability classification is IIe in irrigated areas and IIIs in nonirrigated areas. The woodland ordination symbol is 4A.

BpF—Boone-Plainfield-Rock outcrop complex, 12 to 60 percent slopes. This unit consists of moderately steep to very steep, excessively drained soils intermingled with sandstone outcrop. It is on convex ridges and side slopes in the uplands. The Boone soil is moderately deep. The Plainfield soil is deep. Individual areas are elongated and range from 3 to 100 acres in size. They are 45 to 55 percent Boone soil, 20 to 30 percent Plainfield soil, and 10 to 20 percent Rock outcrop. The two soils and Rock outcrop occur as areas so intricately intermingled or so small that mapping them separately was not practical at the scale used.

Typically, the Boone soil has a surface layer of very dark gray fine sand about 2 inches thick. The substratum is brownish yellow and light yellowish brown, loose fine sand about 31 inches thick. Yellowish brown, light yellowish brown, brownish yellow, and white sandstone is at a depth of about 33 inches. Some areas are eroded. In some areas the content of gravel is as much as 35 percent. Some small areas have slopes of less than 12 percent.

Typically, the Plainfield soil has a surface layer of black fine sand about 2 inches thick. The subsoil is dark yellowish brown and yellowish brown, very friable fine sand about 17 inches thick. The substratum to a depth of about 60 inches is light yellowish brown, loose sand. Some areas are eroded. In some areas the content of gravel is as much as 35 percent. In many areas the content of quartz sand is more than 90 percent. Some small areas have slopes of less than 12 percent.

Typically, the Rock outcrop is sandstone. In one area at the village of Necedah, however, it is quartzite. Many of these areas are vertical or nearly vertical escarpments.

Included with these soils and Rock outcrop in mapping are small areas of the somewhat excessively drained Eleva soils. These included soils are in landscape positions similar to those of the Boone and Plainfield soils. They have more silt and clay and less sand in the solum than the Boone and Plainfield soils. Also included are small areas where the soil is less than 20 inches deep over sandstone. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is rapid in the Boone and Plainfield soils. Available water capacity is very low in the Boone soil and low in the Plainfield soil. The depth of root penetration in the Boone soil is limited by the underlying sandstone.

Most areas are used as native woodland and provide habitat for wildlife. Some areas are used for unimproved pasture. Some are planted to pine.

These soils are unsuitable for cultivated crops because of the low or very low available water capacity, a severe or very severe hazard of water erosion, and the hazard of soil blowing.

These soils are poorly suited to pasture because of the slope and the low or very low available water capacity. In the less sloping areas, where machinery can be operated, pasture management includes applications of lime and fertilizer, seeding, and pasture renovation. The steeper slopes generally can be used only for bluegrass and other native forage species. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

These soils are suited to trees. The problems in managing forest are the slope and the rooting depth. Although production of merchantable wood is marginal on the Boone soil, the trees are effective in controlling soil blowing and water erosion. Planting on the contour and carefully locating skid roads during harvest minimize erosion and equipment limitations. The seedling survival rate on the steeper slopes facing south and west can be increased by carefully planting

vigorous nursery stock. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees on the Boone soil.

These soils are generally unsuited to septic tank absorption fields because of the depth to bedrock and the slope. They are generally unsuited to dwellings because of the slope. Overcoming these limitations is difficult.

These soils are poorly suited to local roads and streets because of the slope. Building the roads and streets on the contour helps to overcome this limitation. Cutting and filling also help to overcome the slope, but the underlying bedrock can limit the depth of cuts.

The land capability classification is VIIs in nonirrigated areas. The woodland ordination symbol assigned to the Boone soil is 2R, and that assigned to the Plainfield soil is 8R. The Rock outcrop is not assigned a woodland ordination symbol.

CuA—Curran silt loam, 0 to 3 percent slopes. This deep, nearly level and gently sloping, somewhat poorly drained soil is on low flats, in drainageways and depressions, and on concave foot slopes on stream and lake terraces. In some areas it is subject to rare flooding. Most areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil is about 44 inches thick. It is brown, grayish brown, and light brownish gray, mottled, friable silt loam and silty clay loam in the upper part and yellowish brown, mottled, very friable, stratified silt loam, loam, sandy loam, and loamy sand in the lower part. The substratum to a depth of about 60 inches is yellowish brown, loose loamy sand. In some areas the silty mantle is less than 40 inches thick, and in other areas it is more than 60 inches thick. In places the slope is more than 3 percent. In some areas the surface layer is loam or sandy loam, and in other areas the dark surface layer is more than 10 inches thick. In some places the subsoil contains more sand and less silt. In other places the subsoil is clay or silty clay below a depth of 20 inches. In some areas the depth to the sandy substratum is only 20 to 40 inches, and in other areas the substratum has thin strata of loamy or clayey deposits or is loamy or clayey.

Included with this soil in mapping are small areas of Ettrick, Jackson, and Manawa soils. The poorly drained and very poorly drained Ettrick soils are lower on the landscape than the Curran soil. The moderately well drained Jackson soils are in the slightly higher landscape positions. The somewhat poorly drained Manawa soils are in positions on the landscape similar to those of the Curran soil. They formed dominantly in clayey deposits. Also included are small areas where the surface layer is sand or loamy sand. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderate in the subsoil of the Curran soil and rapid in the substratum. Available water capacity is very high. In undrained areas the seasonal high water table is 1 to 3 feet below the surface during wet periods. The depth of root penetration is limited by the water table during the wet parts of the growing season. Organic matter content is moderately low or moderate in the surface layer. This layer is friable and can be easily tilled. It tends to crust, however, after heavy rains.

Most areas are drained and are used for crops or pasture. Undrained areas provide habitat for wildlife. Some are used as unimproved pasture. Some small areas are used as native woodland.

If drained, this soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. Areas that are subject to flooding can be protected by dikes or diversions. A surface drainage system can rapidly remove excess surface water. Open ditches and tile drains improve internal drainage. If the tile is installed in the sandy substratum, the loose sand enters the tile lines unless a suitable filter is used. Unless they are protected by a plant cover, ditch banks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

If drained, this soil is suited to legumes and grasses for improved pasture. Overgrazing, however, depletes the plant cover and results in an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and reduces the rate of water infiltration. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields and dwellings because of the water table and, in some areas, because of the flooding. Where the seasonal high water table is at a depth of more than 2 feet and the area is not subject to flooding, constructing a mound of suitable filtering material helps to overcome the wetness.

The wetness on sites for dwellings can be overcome

by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness. The areas on flood plains should not be used as sites for dwellings or septic tank absorption fields.

This soil is poorly suited to local roads and streets because of low strength and the potential for frost action and, in some areas, because of the flooding. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome low strength and frost action. Building the roads on raised fill material and installing large culverts help to prevent the damage caused by flooding.

The land capability classification is IIw in nonirrigated areas. The woodland ordination symbol is 2A.

Dc—Dawson muck, 0 to 1 percent slopes. This deep, nearly level, very poorly drained soil is on low flats and in drainageways and depressions on outwash plains, on stream terraces, and in basins of glacial lakes. It is subject to ponding. Most areas are irregular in shape and range from 3 to 180 acres in size. One area is about 485 acres.

Typically, the upper 38 inches is black muck. The substratum to a depth of about 60 inches is dark gray, loose sand. In some areas the surface layer is mucky peat. In other areas the soil has as much as 20 inches of sandy or loamy overwash. In some places sandy or loamy layers are in the organic material, and in other places loamy layers are in the underlying sand.

Included with this soil in mapping are small areas of Loxley, Meehan, Newson, and Palms soils. The very poorly drained Loxley and Palms soils and the poorly drained and very poorly drained Newson soils are in positions on the landscape similar to those of the Dawson soil. Loxley soils are organic to a depth of more than 51 inches. Palms soils are underlain by silty or loamy deposits. Newson soils are sandy throughout. The somewhat poorly drained Meehan soils are higher on the landscape than the Dawson soil. They are sandy throughout. Also included are some areas where the soil is subject to flooding and a few small areas where the substratum is clayey throughout or in the lower part. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderately slow to moderately rapid in the organic layer of the Dawson soil and rapid in the substratum. Available water capacity is very high. In undrained areas the water table is above or near the surface much of the year. The depth of root penetration is limited by the water table and by the underlying sand.

Most areas are undrained and support low-growing native wetland vegetation. These areas provide habitat for wildlife. Some are used as unimproved pasture. Some areas are drained and are used for crops or pasture. Many areas that were drained and cultivated have reverted to wetland.

Unless it is drained, this soil is generally unsuitable for cultivated crops. If drained, it is suited to corn, soybeans, small grain, vegetables, and mint. The soil is suited to sprinkler irrigation, which can improve productivity. In many areas the length of the growing season is severely limited by frost. Also, some areas cannot be drained because they do not have a suitable outlet. Open ditches and tile drains are used to improve internal drainage. If the tile is installed in the sandy substratum, loose sand enters the tile lines unless a suitable filter is used. Unless they are protected by a plant cover, ditch banks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. Drained areas are subject to burning and subsidence. Controlled drainage minimizes the subsidence. Low strength restricts the use of machinery. Soil blowing is a hazard in cultivated areas. It can be controlled by field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop. Applications of lime and fertilizer are needed.

This soil is generally not suited to use as pasture. There are few suitable forage species. Low strength restricts the use of machinery. Cattle hooves cut the soil and damage the plant cover.

Because of extreme acidity and the high water table, this soil is generally unsuited to trees. It does not support trees of merchantable size or quality.

Because of the subsidence, ponding, the moderately slow permeability, and low strength, this soil is generally unsuitable as a site for septic tank absorption fields and dwellings. Overcoming these limitations is difficult.

This soil is poorly suited to local roads and streets because of the subsidence, the ponding, and the potential for frost action. Subsidence and frost action can be controlled by replacing the organic part of the soil with coarse textured base material, such as sand or gravel. Building the roads on raised fill material and installing culverts help to prevent the damage caused by ponding.

The land capability classification is VIIw, undrained, and IVw, drained, in irrigated and nonirrigated areas. This soil is not assigned a woodland ordination symbol.

DeB—Delton loamy fine sand, moderately well drained, 1 to 6 percent slopes. This deep, nearly level

and gently sloping, moderately well drained soil is on flats and convex side slopes on stream and lake terraces. Most areas are irregular in shape and range from 3 to 35 acres in size.

Typically, the surface layer is dark brown loamy fine sand about 10 inches thick. The subsoil is about 38 inches thick. It is brown, very friable fine sand and brown, mottled, very friable fine sand in the upper part; brown, mottled, friable fine sandy loam in the next part; and reddish brown, mottled, very firm silty clay and clay in the lower part. The substratum to a depth of about 60 inches is reddish brown, very firm clay. Some areas are eroded, commonly as a result of soil blowing. Some small areas have slopes of less than 1 percent or more than 6 percent. In some places the surface layer is sand or loamy sand. In other places the sandy mantle is less than 20 inches or more than 40 inches deep over clayey deposits.

Included with this soil in mapping are small areas of Plainfield and Wyeville soils, the Friendship soils that have a loamy substratum, and the Friendship soils that are sandy throughout. Both Friendship soils are moderately well drained. They are in positions on the landscape similar to those of the Delton soil. The Friendship soils that have a loamy substratum are underlain by loamy deposits at a depth of 40 to 54 inches. The excessively drained Plainfield soils are higher on the landscape than the Delton soil and are sandy throughout. The somewhat poorly drained Wyeville soils are lower on the landscape than the Delton soil. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderately rapid in the sandy upper part of the Delton soil and slow or very slow in the clayey lower part. Available water capacity is moderate. A perched seasonal high water table is 1.5 to 3.5 feet below the surface during wet periods. Organic matter content is low or very low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used for crops or pasture. Some areas are used as native woodland and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During dry years crop yields are somewhat limited by the moderate available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. If cultivated crops are grown, water erosion is a slight hazard. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface. Water erosion also can be controlled by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years forage yields are somewhat limited by the moderate available water capacity. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields because of the perched water table and the slow or very slow permeability. Where the seasonal high water table is at a depth of more than 2 feet, these limitations can be overcome by constructing a mound of suitable filtering material.

This soil is only moderately suited to dwellings without basements and to local roads and streets and is poorly suited to dwellings with basements. It is limited by the perched water table. The wetness can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness.

The land capability classification is IIe in irrigated areas and IIIe in nonirrigated areas. The woodland ordination symbol is 4A.

EeB—Eleva sandy loam, 2 to 6 percent slopes. This moderately deep, gently sloping, somewhat excessively drained soil is on convex ridgetops and side slopes in the uplands and on lake terraces. Most areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is brown sandy loam about 9 inches thick. The subsoil is brown and strong brown, friable sandy loam about 12 inches thick. The substratum is strong brown, loose sand about 9 inches thick. Reddish yellow and strong brown sandstone is at a depth of about 30 inches. Some areas are eroded. Some small areas have slopes of less than 2 percent or more than 6 percent. In some places the surface layer is silt loam, loam, or loamy sand. In other places the content of gravel is as much as 35 percent in the

subsoil and substratum. In places the depth to sandstone is more than 40 inches.

Included with this soil in mapping are small areas of the well drained Elkmound and Gale soils, the somewhat poorly drained Hixton Variant soils, and the excessively drained Plainbo soils. Elkmound and Gale soils are in landscape positions similar to those of the Eleva soil. Elkmound soils are less than 20 inches deep over sandstone. Gale soils have more silt and clay and less sand in the subsoil than the Eleva soil. Hixton Variant soils are lower on the landscape than the Eleva soil. Plainbo soils are sandy throughout. Also included are small severely eroded areas of Eleva sandy loam. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderate or moderately rapid in the subsoil of the Eleva soil and moderately rapid or rapid in the substratum. Available water capacity is low. The depth of root penetration is limited by the underlying sandstone. Organic matter content is moderately low or moderate in the surface layer. This layer is friable and can be easily tilled.

Most areas are used for crops or pasture. Some areas are used as native woodland and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During most years, however, crop yields are limited by the low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. If the soil is cultivated, the hazard of water erosion is slight or moderate. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years forage yields are limited by the low available water capacity. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the rooting depth and competing vegetation. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields. It is limited by the depth to bedrock. The sandy substratum and the sandstone do not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. This limitation can be overcome in some areas by constructing a mound of suitable filtering material. The soil is suited to dwellings. It is only moderately suited to local roads and streets because of the potential for frost action. This limitation can be overcome by covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel.

The land capability classification is IIe in irrigated areas and IIIs in nonirrigated areas. The woodland ordination symbol is 2D.

EeC2—Eleva sandy loam, 6 to 12 percent slopes, eroded. This moderately deep, sloping, somewhat excessively drained soil is on convex ridgetops and side slopes in the uplands and on lake terraces. Most areas are irregular in shape and range from 3 to 10 acres in size.

In most cultivated areas, some of the original surface layer has been removed through water erosion. Typically, the remaining surface layer is about 9 inches thick. It is brown sandy loam that has been intermingled with some yellowish brown loam by plowing. The subsoil is about 14 inches thick. It is yellowish brown, friable loam in the upper part and brown, friable loam and sandy loam in the lower part. The substratum is yellowish brown, loose sand about 8 inches thick. Brownish yellow, yellowish brown, and dark yellowish brown sandstone is at a depth of about 31 inches. Some areas are uneroded. Some small areas have slopes of less than 6 percent or more than 12 percent. In some places the surface layer is silt loam, loam, or loamy sand. In other places the content of gravel is as much as 35 percent in the subsoil and substratum. In places the depth to sandstone is more than 40 inches.

Included with this soil in mapping are small areas of the well drained Gale soils and the excessively drained Plainbo soils. These soils are in landscape positions similar to those of the Eleva soil. Gale soils have more silt and clay and less sand in the subsoil than the Eleva soil. Plainbo soils are sandy throughout. Also included are some severely eroded areas of Eleva sandy loam

and some small areas where the soil is less than 20 inches deep over sandstone. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderate or moderately rapid in the subsoil of the Eleva soil and moderately rapid or rapid in the substratum. Available water capacity is low. The depth of root penetration is limited by the underlying sandstone. Organic matter content is moderately low or moderate in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used for crops or pasture. Some are used as native woodland and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During most years, however, crop yields are limited by the low available water capacity. The available water capacity and the depth of root penetration have been reduced by water erosion in most cultivated areas. The soil is suited to sprinkler irrigation, which can improve productivity. If the soil is cultivated, further water erosion is a moderate hazard. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years forage yields are limited by the low available water capacity. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are rooting depth and competing vegetation. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields. It is limited by the depth to bedrock. The sandy substratum and the sandstone do not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. These limitations can be overcome in some areas by constructing a mound of suitable filtering material.

This soil is only moderately suited to dwellings and to local roads and streets because of the slope. It is also only moderately suited to local roads and streets because of the potential for frost action. The buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas, but the underlying bedrock can limit the depth of cuts. Building the roads and streets on the contour or cutting and filling help to overcome the slope, but the underlying bedrock can limit the depth of cuts. Frost action can be controlled by covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel.

The land capability classification is IIIe in irrigated and nonirrigated areas. The woodland ordination symbol is 2D.

EeD2—Eleva sandy loam, 12 to 20 percent slopes, eroded. This moderately deep, moderately steep, somewhat excessively drained soil is on convex ridgetops and side slopes in the uplands. Most areas are irregular in shape and range from 3 to 20 acres in size.

In most cultivated areas, some of the original surface layer has been removed through water erosion. Typically, the remaining surface layer is about 8 inches thick. It is dark brown sandy loam that has been intermingled with some dark yellowish brown sandy loam by plowing. The subsoil is dark yellowish brown, friable sandy loam about 21 inches thick. The substratum is yellowish brown, loose sand about 4 inches thick. Yellowish brown, dark yellowish brown, and very pale brown sandstone is at a depth of about 33 inches. Some areas are uneroded. Some small areas have slopes of less than 12 percent or more than 20 percent. In some places the surface layer is silt loam, loam, or loamy sand. In other places the content of gravel is as much as 35 percent in the subsoil and substratum. In places the depth to sandstone is more than 40 inches.

Included with this soil in mapping are small areas of the excessively drained Boone soils. These soils are in landscape positions similar to those of the Eleva soil. They are sandy throughout. Also included are severely eroded areas of Eleva sandy loam, small areas where stones and boulders are on the surface, small areas where the soil is less than 20 inches deep over sandstone, and small areas where the subsoil has more

silt and clay and less sand than the Eleva soil. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderate or moderately rapid in the subsoil of the Eleva soil and moderately rapid or rapid in the substratum. Available water capacity is low. The depth of root penetration is limited by the underlying sandstone. Organic matter content is moderately low or moderate in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used for crops or pasture. Some are used as native woodland and provide habitat for wildlife.

This soil is poorly suited to cultivated crops but is suited to legumes and grasses for hay. During most years, however, crop yields are limited by the low available water capacity. The available water capacity and the depth of root penetration have been reduced by water erosion in most cultivated areas. If the soil is cultivated, further water erosion is a severe hazard. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years forage yields are limited by the low available water capacity. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are slope, the rooting depth, and competing vegetation. Planting on the contour and carefully locating skid roads during harvest minimize water erosion and equipment limitations. The seedling survival rate on the steeper slopes facing south and west can be increased by carefully planting vigorous nursery stock. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields. It is limited by the depth to bedrock and the slope. The sandy substratum and the sandstone do not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. These limitations can be overcome in some areas by constructing a mound of suitable filtering material and by shaping the site to a suitable slope. The underlying bedrock, however, can limit the depth of cuts. In most areas the limitations cannot be overcome. A less sloping area where the soil is deeper over bedrock should be selected.

This soil is poorly suited to dwellings and to local roads and streets because of the slope. The buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas, but the underlying bedrock can limit the depth of cuts. Building the roads and streets on the contour or cutting and filling help to overcome the slope, but the underlying bedrock can limit the depth of cuts.

The land capability classification is IVe in nonirrigated areas. The woodland ordination symbol is 2R.

EkF—Eleva-Boone-Rock outcrop complex, 30 to 60 percent slopes. This unit consists of moderately deep, very steep soils and sandstone outcrop. It is on convex side slopes in the uplands. The Eleva soil is somewhat excessively drained, and the Boone soil is excessively drained. Individual areas are elongated and range from 3 to 325 acres in size. They are 35 to 45 percent Eleva soil, 30 to 40 percent Boone soil, and 15 to 25 percent Rock outcrop. The two soils and Rock outcrop occur as areas so intricately intermingled or so small that mapping them separately was not practical at the scale used.

Typically, the Eleva soil has a surface layer of dark grayish brown sandy loam about 2 inches thick. The subsoil is about 24 inches thick. It is dark yellowish brown, very friable sandy loam in the upper part and yellowish brown, very friable and friable sandy loam in the lower part. Strong brown sandstone is at a depth of about 26 inches. Some areas are eroded. Some small areas have slopes of less than 30 percent. In places the depth to sandstone is more than 40 inches.

Typically, the Boone soil has a surface layer of dark grayish brown fine sand about 2 inches thick. The substratum is yellowish brown, loose fine sand about 23 inches thick. Brownish yellow and very pale brown sandstone is at a depth of about 25 inches. Some areas are eroded. Some small areas have slopes of less than

30 percent. In some places the surface layer is loamy sand. In other places the depth to sandstone is more than 40 inches.

The Rock outcrop is sandstone. Many of these areas are vertical or nearly vertical escarpments.

Included with these soils and Rock outcrop in mapping are small areas of the excessively drained Plainfield soils. These included soils are in landscape positions similar to those of the Eleva and Boone soils. They are sandy throughout. Also included are small areas of soils that have a loess mantle 20 to 40 inches thick, small areas that are stony or bouldery, and areas where the soil is less than 20 inches deep over sandstone. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderate or moderately rapid in the Eleva soil and rapid in the Boone soil. Available water capacity is low in the Eleva soil and very low in the Boone soil. The depth of root penetration is limited by the underlying sandstone.

Most areas are used as native woodland and provide habitat for wildlife. Some areas are used for unimproved pasture. Some are planted to pine.

These soils are unsuitable for cultivated crops because of the low or very low available water capacity, a very severe hazard of water erosion, and the hazard of soil blowing.

These soils are poorly suited to pasture because of the slope and the low or very low available water capacity. Forage is generally limited to bluegrass and other naturally occurring forage species. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

The Eleva and Boone soils are suited to trees. The problems in managing forest are the slope, the rooting depth, and competing vegetation. Although production of merchantable wood is marginal on the Boone soil, the trees are effective in controlling soil blowing and water erosion. Planting on the contour and carefully locating skid roads during harvest minimize erosion and equipment limitations. The seedling survival rate on the steeper slopes facing south and west can be increased by carefully planting vigorous nursery stock. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled on the Eleva soil by herbicides or by mechanical site preparation.

These soils are generally unsuited to septic tank absorption fields because of the depth to bedrock and the slope. They are generally unsuited to dwellings because of the slope. Overcoming these limitations is difficult.

These soils are poorly suited to local roads and streets because of the slope. Building the roads and streets on the contour helps to overcome this limitation. Cutting and filling also help to overcome the slope, but the underlying bedrock can limit the depth of cuts.

The land capability classification is VIIs in nonirrigated areas. The woodland ordination symbol assigned to the Eleva and Boone soils is 2R. The Rock outcrop is not assigned a woodland ordination symbol.

EnB—Elkmound sandy loam, 1 to 6 percent slopes. This shallow, nearly level and gently sloping, well drained soil is on flat or convex ridgetops and convex side slopes in the uplands and on lake terraces. Most areas are irregular in shape and range from 3 to 20 acres in size.

Typically, the surface layer is very dark gray sandy loam about 2 inches thick. The subsoil is about 14 inches thick. It is brown and dark yellowish brown, friable sandy loam. Reddish brown and yellowish red sandstone is at a depth of about 16 inches. In places the surface layer is loamy sand or loam. Some areas are eroded. Other areas have slopes of less than 1 percent or more than 6 percent. In some places the content of gravel is as much as 35 percent in the surface layer and subsoil. In other places the soil is less than 10 inches deep over sandstone.

Included with this soil in mapping are small areas of the somewhat excessively drained Eleva soils and the excessively drained Plainbo soils. These soils are in positions on the landscape similar to those of the Elkmound soil. They are 20 to 40 inches deep over sandstone. Also, Plainbo soils are sandy. Also included are small severely eroded areas of Elkmound sandy loam and small areas that are somewhat poorly drained. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderate or moderately rapid in the Elkmound soil. Available water capacity is very low. The depth of root penetration is limited by the underlying sandstone. Organic matter content is moderately low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used as native woodland and provide habitat for wildlife. Some are used for crops or pasture. Some are planted to pine.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During most years, however, crop yields are limited by the very low

available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. If the soil is cultivated, the hazard of water erosion is slight or moderate. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years forage yields are limited by the very low available water capacity. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The main problem in managing forest is the rooting depth. Planting vigorous nursery stock reduces the seedling mortality rate. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees.

This soil is poorly suited to septic tank absorption fields. It is limited by the depth to bedrock. Overcoming this limitation is difficult.

This soil is poorly suited to dwellings and to local roads and streets because of the depth to bedrock. This limitation can be overcome by excavating the bedrock by blasting or by suitable power equipment. It can also be overcome by constructing the footings and basements above the bedrock to avoid the need for excavation.

The land capability classification is IIe in irrigated areas and IIIe in nonirrigated areas. The woodland ordination symbol is 2D

Et—Ettrick silt loam, 0 to 2 percent slopes. This deep, nearly level, poorly drained and very poorly drained soil is on low flats and in drainageways and depressions on low stream terraces, lake terraces, and flood plains. It is subject to frequent flooding and ponding. Most areas are elongated and range from 3 to 480 acres in size.

Typically, the surface layer is black silt loam about 11 inches thick. The subsoil is about 33 inches thick. It is grayish brown, light olive gray, and olive gray, mottled, firm silt loam in the upper part and light olive gray, mottled, friable silt loam in the lower part. The upper part of the substratum is olive gray, mottled, friable silt loam. The lower part to a depth of about 60 inches is olive gray, mottled, loose loamy fine sand. In some areas the surface layer is loam, silty clay loam, or muck. In other areas the dark silt loam is more than 20 inches thick. In places the substratum is clay or silty clay. Some small areas have slopes of more than 2 percent.

Included with this soil in mapping are small areas of Curran, Lows, Orion, and Palms soils. The somewhat poorly drained Curran and Orion soils are higher on the landscape than the Ettrick soil. Curran soils are not on flood plains. Orion soils have less clay and more silt than the Ettrick soil. The poorly drained Lows and the very poorly drained Palms soils are in positions on the landscape similar to those of the Ettrick soil, but they are not on flood plains. Lows soils have more sand and less silt in the subsoil than the Ettrick soil. They are 20 to 40 inches deep over sand. Palms soils have a 16- to 51-inch organic layer over silty or loamy deposits. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability in the Ettrick soil is moderately slow in the silty alluvium and moderate or moderately rapid in the substratum. Available water capacity is very high. In undrained areas the water table is above or near the surface much of the year. The depth of root penetration is limited by the water table. Organic matter content is high or very high in the surface layer. This layer is friable and can be easily tilled. It tends to crust, however, after heavy rains.

Most areas are drained and are used for crops. Undrained areas support native wetland vegetation and provide habitat for wildlife. Some are used for unimproved pasture or for woodland.

Unless it is drained, this soil is generally unsuitable for cultivated crops. If drained and protected from flooding, however, it is suited to corn, soybeans, and small grain and to legumes and grasses for hay. Dikes and diversions can be used to prevent flooding. A surface drainage system can remove excess surface water rapidly. Open ditches and tile drains improve internal drainage. Unless they are protected by a plant cover, ditch banks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is unsuitable for most forage species unless it is drained. Certain legumes and grasses can be

grown for improved pasture in drained areas. Overgrazing depletes the plant cover and results in an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and reduces the rate of water infiltration. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the water table and competing vegetation. Wetness during the planting season generally limits reforestation to natural regeneration. Harvesting is frequently limited to periods when the soil is frozen. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is generally unsuitable as a site for septic tank absorption fields because of the flooding, the ponding, and the moderately slow permeability and as a site for dwellings because of the flooding and the ponding. Overcoming these limitations is difficult.

Because of low strength, the ponding, and the flooding, this soil is poorly suited to local roads and streets. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome low strength. Building the roads on raised fill material and installing large culverts help to overcome the damage caused by flooding and ponding.

The land capability classification is IIw, drained, and VIw, undrained. The woodland ordination symbol is 2W.

FrB—Friendship sand, 1 to 6 percent slopes. This deep, nearly level and gently sloping, moderately well drained soil is on flats and convex side slopes on outwash plains, on stream terraces, and in basins of glacial lakes. Most areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is black sand about 2 inches thick. The subsoil is about 27 inches thick. It is brown and dark yellowish brown, very friable sand. The substratum to a depth of about 60 inches is yellowish brown and dark yellowish brown, mottled, loose sand. Some areas are eroded as a result of soil blowing. Other areas have slopes of less than 1 percent or more than 6 percent. In some places the surface layer is loamy sand, loamy fine sand, fine sand, or fine sandy loam. In other places the soil is 40 to 60 inches deep over sandstone. In some areas the content of quartz sand is more than 90 percent. In other areas the content of gravel is as much as 35 percent.

Included with this soil in mapping are small areas of Meehan, Plainbo, and Plainfield soils. The somewhat poorly drained Meehan soils are slightly lower on the landscape than the Friendship soil. The excessively drained Plainbo and Plainfield soils are slightly higher on the landscape than the Friendship soil. Plainbo soils are 20 to 40 inches deep over sandstone. Also included are small areas that are severely eroded as a result of soil blowing. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is rapid in the Friendship soil. Available water capacity is low. The seasonal high water table is 2.5 to 6.0 feet below the surface during wet periods. Organic matter content is low or moderately low in the surface layer. This layer is very friable and can be easily tilled.

Some areas are used as native woodland and provide habitat for wildlife. Some areas are used for crops or pasture. Many areas that were cultivated now support native vegetation or have been planted to pine (fig. 8).

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During most years, however, crop yields are limited by the low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. If the soil is cultivated, the hazard of water erosion is slight. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by a winter cover crop. Erosion also can be controlled by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Wind stripcropping and field windbreaks help to prevent the damage to plants caused by windblown sand. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility.

If irrigated, this soil is suited to vegetable crops, such as sweet corn, peas, potatoes, and snap beans. Because of the rapid permeability, the irrigation rate should be limited. Limiting the irrigation rate helps to prevent the leaching of plant nutrients and other chemicals out of the root zone and eventually into the underlying ground water.

This soil is suited to legumes and grasses for pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years forage yields are limited by the low available water capacity. Overgrazing depletes the plant cover

Figure 8.—Red pine plantation in an area of Friendship sand, 1 to 6 percent slopes.

and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The main problem in managing forest is the sandy soil texture. Planting and harvesting with wheel-type tractors are somewhat limited because of the sandy surface and subsoil. Planting vigorous nursery stock reduces the seedling mortality rate.

This soil is poorly suited to septic tank absorption fields because of the water table. This limitation can be overcome by constructing a mound of suitable filtering material. The soil is only moderately suited to dwellings with basements because of the water table. This limitation can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness.

This soil is suited to dwellings without basements and to local roads and streets.

The land capability classification is IIIe in irrigated areas and IVs in nonirrigated areas. The woodland ordination symbol is 6S.

FsB—Friendship loamy sand, loamy substratum, 1 to 6 percent slopes. This deep, nearly level and gently sloping, moderately well drained soil is on flats and convex side slopes on outwash plains, on stream terraces, and in basins of glacial lakes. Most areas are irregular in shape and range from 3 to 160 acres in size.

Typically, the surface layer is very dark grayish brown loamy sand about 8 inches thick. The subsoil is dark yellowish brown, very friable loamy sand and sand about 23 inches thick. The upper part of the substratum is brownish yellow, loose sand. The lower part to a depth of about 60 inches is strong brown, mottled, friable sandy loam. Some areas are eroded, commonly as a result of soil blowing. Other areas have slopes of less than 1 percent or more than 6 percent. In some places the surface layer is sand, fine sand, loamy fine sand, or fine sandy loam. In other places the subsoil has loamy layers.

Included with this soil in mapping are small areas of Billett, Delton, Plainfield, and Roby soils and Friendship soils that are sandy throughout. The well drained and moderately well drained Billett soils and the moderately well drained Delton soils are in landscape positions similar to or slightly higher than those of the major Friendship soil. The Friendship soils that are sandy throughout are moderately well drained. They are in landscape positions similar to or slightly higher than the major Friendship soil. Billett soils have more silt and clay and less sand in the subsoil than the major Friendship soil. Delton soils are underlain by clayey deposits at a depth of 20 to 40 inches. The excessively drained Plainfield soils are higher on the landscape than the major Friendship soil and are sandy throughout. The somewhat poorly drained Roby soils are in the lower positions on the landscape. Also, they have more silt and clay and less sand in the subsoil than the major Friendship soil. Also included are small areas that are severely eroded, commonly as a result of soil blowing, and some small areas that are underlain by clayey deposits at a depth of 40 to 60 inches. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is rapid in the sandy upper part of this Friendship soil and moderate in the loamy lower part. Available water capacity is low. A perched seasonal high water table is 3 to 6 feet below the surface during wet periods. Organic matter content is low or moderately low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used for crops or pasture. Some areas are used as native woodland and provide habitat for wildlife. Some areas are planted to pine.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During most years, however, crop yields are limited by the low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. If the soil is cultivated, the hazard of water erosion is slight. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by a winter cover crop. Water erosion also can be controlled by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Wind stripcropping and field windbreaks help to prevent the damage to plants caused by windblown sand. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility.

This soil is suited to legumes and grasses for pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years forage yields are limited by the low available water capacity. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The main problem in managing forest is the sandy soil texture. Planting and harvesting with wheel-type tractors are somewhat limited because of the sandy surface layer and subsoil. Planting vigorous nursery stock reduces the seedling mortality rate.

This soil is poorly suited to septic tank absorption fields because of the water table. This limitation can be

overcome by constructing a mound of suitable filtering material. The soil is only moderately suited to dwellings with basements because of the water table. This limitation can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness.

This soil is suited to dwellings without basements and to local roads and streets.

The land capability classification is IIe in irrigated areas and IIIs in nonirrigated areas. The woodland ordination symbol is 6S.

GaB—Gale silt loam, 2 to 6 percent slopes. This moderately deep, gently sloping, well drained soil is on convex ridgetops and side slopes in the uplands. Most areas are irregular in shape and range from 3 to 50 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil is about 19 inches thick. It is brown, firm silt loam in the upper part and strong brown, friable sandy loam in the lower part. The substratum is reddish yellow, loose sand about 11 inches thick. Strong brown, partly consolidated sandstone is at a depth of about 38 inches. Some areas are eroded. In some areas the slope is less than 2 percent or more than 6 percent. In other areas the surface layer is loam. In some places the subsoil has more sand and less silt. In other places the depth to sandstone is more than 40 inches.

Included with this soil in mapping are small areas of the somewhat excessively drained Eleva soils and the moderately well drained Jackson soils. Eleva soils are in positions on the landscape similar to those of the Gale soil. They have more sand and less silt and clay than the Gale soil. Jackson soils are slightly lower on the landscape than the Gale soil. They formed in 40 to 60 inches of silty deposits and are underlain by sandy deposits. Also included are severely eroded areas of Gale silt loam that are somewhat poorly drained and in seepy areas and small areas where the depth to sandstone is less than 20 inches. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderate in the subsoil of the Gale soil and rapid in the substratum. Available water capacity is moderate. The depth of root penetration is limited by the underlying sandstone. Organic matter content is moderately low or moderate in the surface layer. This layer is friable and can be easily tilled. It tends to crust, however, after heavy rains..

Most areas are used for crops or pasture. Some are used as native woodland and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During dry years crop yields are somewhat limited by the moderate available water capacity. If the soil is cultivated, the hazard of water erosion is slight or moderate. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion. During dry years forage yields are somewhat limited by the moderate available water capacity. Overgrazing depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and increases the runoff rate and the hazard of erosion. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the rooting depth and competing vegetation. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields in some areas. It is limited by the depth to bedrock and the sandy substratum. The sandy substratum and the sandstone do not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. Constructing a mound of suitable filtering material helps to overcome this limitation. The soil is only moderately suited to dwellings because of the shrink-swell potential. Adding coarse textured material, such as sand or gravel, under and around the basement or under the footings and concrete slab helps to overcome the shrinking and swelling.

Because of low strength and the potential for frost action, this soil is poorly suited to local roads and streets. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome these limitations.

The land capability classification is IIe in nonirrigated areas. The woodland ordination symbol is 5D.

GaC2—Gale silt loam, 6 to 12 percent slopes, eroded. This moderately deep, sloping, well drained soil is on convex ridgetops and side slopes in the uplands. Most areas are irregular in shape and range from 3 to 50 acres in size.

In most cultivated areas, some of the original surface layer has been removed through water erosion. Typically, the remaining surface layer is about 8 inches thick. It is dark grayish brown silt loam that has been intermingled with some dark yellowish brown silt loam by plowing. The subsoil is about 19 inches thick. It is dark yellowish brown and brown, firm silt loam. The substratum is yellowish brown, loose loamy sand about 8 inches thick. Very pale brown, partly consolidated sandstone s at a depth of about 35 inches. Some areas are uneroded. Other areas have slopes of less than 6 percent or more than 12 percent. In some places the subsoil has more sand and less silt. In other places the depth to sandstone is more than 40 inches.

Included with this soil in mapping are small areas of the somewhat excessively drained Eleva soils and the moderately well drained Jackson soils. Eleva soils are in positions on the landscape similar to those of the Gale soil. They have more sand and less silt and clay than the Gale soil. Jackson soils are slightly lower on the landscape than the Gale soil. They formed in 40 to 60 inches of silty deposits and are underlain by sandy deposits. Also included are severely eroded areas of Gale silt loam, somewhat poorly drained soils in seepy areas, and small areas where the depth to sandstone is less than 20 inches. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderate in the subsoil of the Gale soil and rapid in the substratum. Available water capacity is moderate. The depth of root penetration is limited by the underlying sandstone, which is at a shallower depth than in the uneroded Gale soil. Organic matter content is moderately low or moderate in the surface layer. This layer tends to crust after heavy rains and in most cultivated areas readily forms clods if tilled when wet. This is a result of past mixing of firm silt loam from the subsoil into the plowed layer.

Most areas are used for crops or pasture. Some are used as native woodland and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During dry years crop yields are somewhat limited by the moderate available water capacity. If the soil is cultivated, further water erosion is a moderate hazard. It can be controlled by a conservat on tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion. During dry years forage yields are somewhat limited by the moderate available water capacity. Overgrazing depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and increases the runoff rate and the hazard of erosion. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the rooting depth and competing vegetation. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields in some areas. It is limited by the depth to bedrock and sandy substratum. The sandy substratum and the sandstone do not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. This limitation can be overcome by constructing a mound of suitable filtering material. The soil is only moderately suited to dwellings because of the slope and the shrink-swell potential. The buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas, but the underlying bedrock can limit the depth of cuts. Shrinking and swelling can be overcome by adding coarse textured materia , such as sand or gravel, under and around the basement or under the footings and concrete slab.

Because of low strength and the potential for frost action, this soil is poorly suited to local roads and streets. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome these limitations.

The land capability classification is IIIe in nonirrigated areas. The woodland ordination symbol is 5D.

HvA—Hixton Variant loam, 0 to 3 percent slopes. This moderately deep, nearly level and gently sloping, somewhat poorly drained soil is on flats and concave foot slopes and in drainageways and depressions in the

uplands and on stream and lake terraces. In some areas it is subject to occasional flooding. Most areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is black loam about 4 inches thick. The subsoil is about 17 inches thick. It is brown and dark yellowish brown, mottled, friable loam in the upper part and dark yellowish brown, mottled, friable sandy loam in the lower part. The substratum is grayish brown, mottled, loose loamy sand about 6 inches thick. Pale brown and strong brown, partly consolidated sandstone is at a depth of about 27 inches. Some areas have slopes of more than 3 percent. In some places the depth to sandstone is more than 40 inches. In other places the surface layer is sandy loam or silt loam.

Included with this soil in mapping are small areas of Eleva, Elkmound, Partridge, and Roby soils. The somewhat excessively drained Eleva soils and the well drained Elkmound soils are higher on the landscape than the Hixton Variant soil. Elkmound soils are less than 20 inches deep over sandstone. The somewhat poorly drained Partridge and Roby soils are in positions on the landscape similar to those of the Hixton Variant soil. Partridge soils are sandy throughout. Roby soils formed in loamy deposits underlain by sandy and loamy deposits. Also included are small areas of soils that have more silt and clay and less sand in the subsoil than the Hixton Variant soil. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderately rapid in the Hixton Variant soil. Available water capacity is low. In undrained areas a perched seasonal high water table is 1 to 3 feet below the surface during wet periods. The depth of root penetration is limited by the water table during the wet parts of the growing season or by the underlying sandstone. Organic matter content is moderate in the surface layer. This layer is very friable and can be easily tilled.

Most areas are undrained. They are used mostly as native woodland and provide habitat for wildlife. Some of these areas are used for unimproved pasture. Some areas are drained and are used for crops or pasture.

If drained, this soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. Areas that are subject to flooding can be protected by dikes or diversions. A surface drainage system can rapidly remove excess surface water. Open ditches and tile drains improve internal drainage, but the underlying bedrock can limit the depth of cuts. If the tile is installed in the sandy substratum, the loose sand enters the tile lines unless a suitable filter is used. Unless they are protected by a plant cover, ditch banks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. In drained areas crop yields during most years are limited by the low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

If drained, this soil is suited to legumes and grasses for improved pasture. In most years, however, forage yields are limited by the low available water capacity. Overgrazing depletes the plant cover and results in an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and reduces the rate of water infiltration. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the rooting depth and competing vegetation. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields because of the depth to bedrock and the perched water table and, in some areas, because of the flooding. The sandy substratum and the sandstone do not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. Where the seasonal high water table is at a depth of more than 2 feet and the area is not subject to flooding, the poor filtering capacity can be overcome by constructing a mound of suitable filtering material. The soil is poorly suited to dwellings because of the perched water table and, in some areas, because of the flooding. The wetness can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness. The areas on flood plains should not be used as sites for septic tank absorption fields or for dwellings.

Because of the flooding in some areas and the potential for frost action, this soil is poorly suited to local roads and streets. Building the roads on raised fill material and installing large culverts help to prevent the damage caused by flooding. Frost action can be

overcome by covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel.

The land capability classification is IIIw in nonirrigated areas. The woodland ordination symbol is 3W.

JaB—Jackson silt loam, 2 to 6 percent slopes. This deep, gently sloping, moderately well drained soil is on the concave or convex side slopes of stream and lake terraces. Most areas are irregular in shape and range from 3 to 75 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The subsoil is about 47 inches thick. It is brown and dark yellowish brown, friable and firm silt loam in the upper part; dark yellowish brown, mottled, friable silt loam in the next part; and brown, mottled, friable sandy loam in the lower part. The substratum to a depth of about 60 inches is mostly brown, mottled, loose loamy sand. Some small areas are eroded. Other areas have slopes of less than 2 percent or more than 6 percent. In some places the silty mantle is less than 40 inches thick, and in other places it is more than 60 inches thick. In some areas the subsoil is mostly loam or clay loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Curran and well drained Meridian soils. Curran soils are lower on the landscape than the Jackson soil. Meridian soils are slightly higher on the landscape than the Jackson soil. Also, they have more sand and less silt in the subsoil. They are underlain by sand at a depth of 20 to 40 inches. Included soils make up about 5 to 10 percent of individual mapped areas.

Permeability is moderate in the subsoil of the Jackson soil and rapid in the substratum. Available water capacity is high. The seasonal high water table is 2.5 to 6.0 feet below the surface during wet periods. Organic matter content is moderately low or moderate in the surface layer. This layer is friable and can be easily tilled. It tends to crust, however, after heavy rains.

Most areas are used for crops or pasture. Some areas are used as native woodland and provide habitat for wildlife. Some of these areas are used as unimproved pasture.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. If the soil is cultivated, the hazard of water erosion is slight or moderate. It can be controlled by using a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion. Overgrazing, however, depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and increases the runoff rate and the hazard of erosion. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields because of the water table. This limitation can be overcome by constructing a mound of suitable filtering material. The soil is only moderately suited to dwellings because of the shrink-swell potential. Also, the water table is a limitation on sites for dwellings with basements. The water table can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by constructing the basement above the level of wetness. Shrinking and swelling can be overcome by adding coarse textured material, such as sand or gravel, under and around the basement or under the footings and concrete slab.

Because of low strength and the potential for frost action, this soil is poorly suited to local roads and streets. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome these limitations.

The land capability classification is IIe in nonirrigated areas. The woodland ordination symbol is 5A.

KyA—Korobago sandy loam, 0 to 3 percent slopes. This deep, nearly level and gently sloping, somewhat poorly drained soil is on low flats, in drainageways and depressions, and on concave foot slopes on stream and lake terraces. Most areas are irregular in shape and range from 3 to 350 acres in size.

Typically, the surface layer is very dark grayish brown sandy loam about 9 inches thick. The subsoil is about 36 inches thick. It is brown, mottled, friable sandy loam in the upper part and reddish brown, mottled, firm

silty clay in the lower part. The substratum to a depth of about 60 inches is reddish brown, mottled, firm silty clay. Some areas have slopes of more than 3 percent. In some places the surface layer is loamy sand or loam. In other places the loamy mantle is 40 to 60 inches deep over clayey deposits.

Included with this soil in mapping are small areas of the Friendship soils that have a loamy substratum and small areas of Manawa, Poygan, and Wyeville soils. The moderately well drained Friendship soils are slightly higner on the landscape than the Korobago soil. They formed in 40 to 54 inches of sandy deposits underlain by loamy deposits. The somewhat poorly drained Manawa and Wyeville soils are in positions on the landscape similar to those of the Korobago soil. Manawa soils formed dominantly in clayey deposits. Wyeville soils formed in 20 to 40 inches of sandy deposits and in the underlying clayey deposits. The poorly drained Poygan soils are lower on the landscape than the Korobago soil. They formed dominantly in clayey deposits. Also included are small areas where the lower part of the subsoil and the substratum are loamy. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderate in the loamy upper part of the Korobago soil and moderately slow or slow in the clayey lower part. Available water capacity is moderate. In undrained areas a perched seasonal high water table is 1 to 3 feet below the surface during wet periods. The depth of root penetration is limited by the water table during the wet parts of the growing season. Organic matter content is moderately low or moderate in the surface layer. This layer is very friable and can be easily tilled.

Most areas are drained and used for crops or pasture. Undrained areas support native vegetation and provide habitat for wildlife.

If drained, this soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. In drained areas crop yields are somewhat limited during dry years by the moderate available water capacity. This soil is suited to sprinkler irrigation, which can improve productivity. A surface drainage system can rapidly remove excess surface water. Open ditches and tile drains improve internal drainage. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. Where cultivated crops are grown, soil blowing is a hazard. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by a winter cover crop. Wind stripcropping and field windbreaks help to prevent the damage to plants caused by windblown sand. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and increase the rate of water infiltration.

If drained, this soil is suited to legumes and grasses for improved pasture. During dry years forage yields are somewhat limited by the moderate available water capacity. A cover of pasture plants is effective in controlling soil blowing. Overgrazing, however, depletes the plant cover and thus results in soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the rooting depth and competing vegetation. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields because of the perched water table and the moderately slow or slow permeability in the clayey lower part of the soil. Where the seasonal high water table is at a depth of more than 2 feet, these problems can be overcome by constructing a mound of suitable filtering material. The soil is poorly suited to dwellings because of the perched water table. This limitation can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness.

This soil is poorly suited to local roads and streets because of the potential for frost action. This limitation can be overcome by covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel.

The land capability classification is IIw in irrigated and nonirrigated areas. The woodland ordination symbol is 4D.

LfB—La Farge silt loam, 2 to 6 percent slopes. This moderately deep, gently sloping, well drained soil is on convex ridgetops and side slopes in the uplands. Most areas are irregular in shape and range from 3 to 25 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The subsoil is about 30 inches thick. It is brown, yellowish brown, and dark yellowish brown, friable silt loam in the upper part and

dark yellowish brown, friable loam in the lower part. Yellowish brown and yellow, partly consolidated sandstone that has layers and grains of grayish green glauconite is at a depth of about 39 inches. Some areas are eroded. In some areas the slope is less than 2 percent or more than 6 percent. In other areas the surface layer is loam. In some places the subsoil is mostly loam or clay loam. In other places the depth to sandstone is more than 40 inches.

Included with this soil in mapping are small areas of the moderately well drained Rozetta soils and the somewhat excessively drained Urne soils. Rozetta and Urne soils are in positions on the landscape similar to those of the La Farge soil. In the Rozetta soils the depth to sandstone is more than 60 inches. Urne soils have more sand and less silt and clay in the subsoil than the La Farge soil. Also included are small severely eroded areas of La Farge silt loam, somewhat poorly drained soils in seepy areas, and areas where the depth to sandstone is less than 20 inches. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderate in the La Farge soil. Available water capacity is moderate. The depth of root penetration is limited by the underlying sandstone. Organic matter content is moderately low or moderate in the surface layer. This layer is friable and can be easily tilled. It tends to crust, however, after heavy rains.

Most areas are used for crops or pasture. Some are used as native woodland and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During dry years, however, crop yields are somewhat limited by the moderate available water capacity. If the soil is cultivated, the hazard of water erosion is slight or moderate. Water erosion can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion. During dry years forage yields are somewhat limited by the moderate available water capacity. Overgrazing depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and increases the runoff rate and the hazard of erosion. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees (fig. 9). The problems in managing forest are the rooting depth and competing vegetation. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields. It is limited by the depth to bedrock. The sandstone does not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. This limitation can be overcome in some areas by constructing a mound of suitable filtering material. The soil is only moderately suited to dwellings because of the shrink-swell potential. Shrinking and swelling can be overcome by adding coarse textured material, such as sand or gravel, under and around the basement or under the footings and concrete slab.

Because of low strength and the potential for frost action, this soil is poorly suited to local roads and streets. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome these limitations.

The land capability classification is IIe in nonirrigated areas. The woodland ordination symbol is 4D.

LfC2—La Farge silt loam, 6 to 12 percent slopes, eroded. This moderately deep, sloping, well drained soil is on convex ridgetops and side slopes in the uplands. Most areas are irregular in shape and range from 3 to 95 acres in size.

In most cultivated areas, some of the original surface layer has been removed through water erosion. Typically, the remaining surface layer is about 8 inches thick. It is dark grayish brown silt loam that has been intermingled with some dark yellowish brown silt loam by plowing. The subsoil is about 28 inches thick. It is dark yellowish brown, firm silt loam in the upper part and dark yellowish brown, friable loam in the lower part. Yellowish brown, partly consolidated sandstone that has layers and grains of grayish green glauconite is at a depth of about 36 inches. Some areas are uneroded. In some areas the slope is less than 6 percent or more than 12 percent. In other areas the surface layer is loam. In some places the subsoil is mostly loam or clay loam. In other places the depth to sandstone is more than 40 inches.

Figure 9.—Mixed hardwood logs in an area of La Farge silt loam, 2 to 6 percent slopes.

Included with this soil in mapping are small areas of the moderately well drained Rozetta soils and the somewhat excessively drained Urne soils. Rozetta and Urne soils are in positions on the landscape similar to those of the La Farge soil. In the Rozetta soil the depth to sandstone is more than 60 inches. Urne soils have more sand and less silt and clay in the subsoil than the La Farge soil. Also included are small severely eroded areas of La Farge silt loam, somewhat poorly drained soils in seepy areas, areas where stones and boulders are on the surface, and areas where the depth to sandstone is less than 20 inches. Included soils make up about 5 to 10 percent of individual mapped areas.

Permeability is moderate in the La Farge soil.

Available water capacity also is moderate. The depth of root penetration is limited by the underlying sandstone. Organic matter content is moderately low or moderate in the surface layer. This layer tends to crust after heavy rains and in most cultivated areas readily forms clods if tilled when wet. This is a result of past mixing of firm silt loam subsoil material into the plowed layer.

Most areas are used for crops or pasture. Some are used as native woodland and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During dry years crop yields are somewhat limited by the moderate available water capacity. The available water capacity and the depth of root penetration have been reduced by erosion in most cultivated areas. If the soil is cultivated, further water erosion is a moderate hazard. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion. During dry years forage yields are somewhat limited by the moderate available water capacity. Overgrazing depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and increases the runoff rate and the hazard of erosion. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the rooting depth and competing vegetation. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields. It is limited by the depth to bedrock. The sandstone does not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. This limitation can be overcome in some areas by constructing a mound of suitable filtering material. The soil is only moderately suited to dwellings because of the slope and the shrink-swell potential. The buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas. Shrinking and swelling can be overcome by adding coarse textured material, such as sand or gravel, under and around the basement or under the footings and concrete slab.

Because of low strength and the potential for frost action, this soil is poorly suited to local roads and streets. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome these limitations.

The land capability classification is IIIe in nonirrigated areas. The woodland ordination symbol is 4D.

LfD2—La Farge silt loam, 12 to 20 percent slopes, eroded. This moderately deep, moderately steep, well drained soil is on convex ridgetops and side slopes in the uplands. Most areas are irregular in shape and range from 3 to 35 acres in size.

In most cultivated areas, some of the original surface layer has been removed through water erosion. Typically, the remaining surface layer is about 8 inches thick. It is dark grayish brown silt loam that has been intermingled with some dark yellowish brown silt loam by plowing. The subsoil is about 24 inches thick. It is dark yellowish brown, firm silt loam in the upper part and brown, friable loam in the lower part. Yellowish brown, partly consolidated sandstone that has layers and grains of grayish green glauconite is at a depth of about 32 inches. Some areas are uneroded. In some areas the slope is less than 12 percent or more than 20 percent. In other areas the surface layer is loam. In some places the subsoil is mostly loam or clay loam. In other places the depth to sandstone is more than 40 inches.

Included with this soil in mapping are small areas of the moderately well drained Rozetta soils and the somewhat excessively drained Urne soils. Rozetta and Urne soils are in positions on the landscape similar to those of the La Farge soil. In the Rozetta soils the depth to sandstone is more than 60 inches. Urne soils have more sand and less silt and clay in the subsoil than the La Farge soil. Also included are small severely eroded areas of La Farge silt loam, somewhat poorly drained soils in seepy areas, areas where stones and boulders are on the surface, and areas where the depth to sandstone is less than 20 inches. Included soils make up about 5 to 10 percent of individual mapped areas.

Permeability is moderate in the La Farge soil. Available water capacity is moderate. The depth of root penetration is limited by the underlying sandstone. Organic matter content is moderately low or moderate

Figure 10.—Contour strips of hay and no-till corn in an area of La Farge silt loam, 12 to 20 percent slopes, eroded.

in the surface layer. This layer tends to crust after heavy rains and in most cultivated areas readily forms clods if tilled when too wet. This is a result of past mixing of firm silt loam subsoil material into the plowed layer.

Most areas are used for crops or pasture. Some are used as native woodland and provide habitat for wildlife.

This soil is poorly suited to cultivated crops but is suited to legumes and grasses for hay. During dry years crop yields are somewhat limited by the moderate available water capacity. The available water capacity and the depth of root penetration have been reduced by water erosion in most cultivated areas. If the soil is cultivated, further water erosion is a severe hazard. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping (fig. 10), a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective

in controlling water erosion. During dry years forage yields are somewhat limited by the moderate available water capacity. Overgrazing depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and increases the runoff rate and the hazard of water erosion. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. Problems in managing forest are the slope, the rooting depth, and competing vegetation. Planting on the contour and carefully locating skid roads during harvest minimize erosion and equipment limitations. The seedling survival rate on the steeper slopes facing south and west can be increased by carefully planting vigorous nursery stock. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields. It is limited by the depth to bedrock and the slope. The sandstone does not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. It can be overcome in some areas by constructing a mound of suitable filtering material and by shaping the site to a suitable slope. The underlying bedrock, however, can limit the depth of cuts. The soil is poorly suited to dwellings because of the slope. The buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas, but the underlying bedrock can limit the depth of cuts.

Because of low strength, the slope, and the potential for frost action, this soil is poorly suited to local roads and streets. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome low strength and frost action. Building the roads and streets on the contour or cutting and filling help to overcome the slope, but the underlying bedrock can limit the depth of cuts.

The land capability classification is IVe in nonirrigated areas. The woodland ordination symbol is 4R.

Lw—Lows loam, 0 to 2 percent slopes. This deep, nearly level, poorly drained soil is on low flats and in drainageways and depressions on stream and lake terraces. It is subject to frequent flooding or ponding or both. Most areas are long and narrow and range from 3 to 320 acres in size.

Typically, the surface layer is black loam about 9 inches thick. The subsoil is about 19 inches thick. It is dark gray and light brownish gray, mottled, friable loam. The upper part of the substratum is light gray and light brownish gray, mottled, loose fine sand. The lower part to a depth of about 60 inches is pale brown, mottled, loose sand. Some small areas have slopes of more than 2 percent. In some areas the surface layer is silt loam or fine sandy loam. In other areas the subsoil is mostly silt loam or silty clay loam. In places the loamy mantle is less than 20 inches or more than 40 inches deep over sand.

Included with this soil in mapping are small areas of the poorly drained and very poorly drained Ettrick and Newson soils and the somewhat poorly drained Roby soils. Ettrick and Newson soils are in positions on the landscape similar to those of the Lows soil. Ettrick soils have more silt and less sand than the Lows soil. They are more than 40 inches deep over sand. Newson soils are sandy throughout. Roby soils are in higher landscape positions than the Lows soil. Also, they have more sand and less clay throughout. Also included are small, poorly drained areas of soils that have more sand and less clay in the subsoil than the Lows soil. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderate in the subsoil of the Lows soil and rapid in the substratum. Available water capacity is moderate. In undrained areas the water table is above or near the surface much of the year. The depth of root penetration is limited by the water table and by the underlying sand. Organic matter content is moderate or high in the surface layer. This layer is friable and can be easily tilled.

Most areas are drained and are used for crops. Undrained areas support native wetland vegetation and provide habitat for wildlife. Some are used as unimproved pasture or as woodland.

Unless it is drained, this soil is generally unsuitable for cultivated crops. If drained and protected from flooding, it is suited to corn, soybeans, and small grain and to legumes and grasses for hay. Dikes and diversions can be used to prevent flooding. A surface drainage system can rapidly remove excess surface water. Open ditches and tile drains improve internal drainage. If the tile is installed in the sandy substratum, loose sand enters the tile lines unless a suitable filter is used. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical

banks cave in and plug the ditch. In drained areas, crop yields in dry years are somewhat limited by the moderate available water capacity. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is unsuitable for most forage species unless it is drained. Legumes and grasses can be grown for improved pasture in drained areas. Overgrazing depletes the plant cover and results in an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and reduces the rate of water infiltration. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the water table and competing vegetation. Wetness during the planting season generally limits reforestation to natural regeneration. Harvesting is frequently limited to periods when the soil is frozen. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is generally unsuitable as a site for septic tank absorption fields and for dwellings because of the flooding and the ponding. Overcoming these limitations is difficult.

Because of the ponding, the flooding, and the potential for frost action, this soil is poorly suited to local roads and streets. Building the roads on raised fill material and installing large culverts help to prevent the damage caused by ponding and flooding. Frost action can be controlled by covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel.

The land capability classification is IIw, drained, and VIw, undrained. The woodland ordination symbol is 2W.

Lx—Loxley muck, 0 to 1 percent slopes. This deep, nearly level, very poorly drained soil is on low flats and in drainageways and depressions on outwash plains and in basins of glacial lakes. It is subject to ponding. Most areas are irregular in shape and range from 6 to 160 acres in size.

Typically, the organic layer is more than 60 inches thick. It is black muck in the upper part and very dark brown muck in the lower part. In some areas the surface layer is mucky peat. In other areas the soil has as much as 20 inches of loamy or sandy overwash. In places the soil has more than 10 inches of mucky peat below the surface layer.

Included with this soil in mapping are small areas of Dawson, Newson, and Palms soils. The very poorly drained Dawson and Palms soils and the poorly drained and very poorly drained Newson soils are in positions on the landscape similar to those of the Loxley soil. Dawson soils have a sandy substratum. Newson soils are sandy throughout. Palms soils have a silty or loamy substratum. Also included are small areas that are subject to flooding. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderately slow to moderately rapid in the Loxley soil. Available water capacity is very high. In undrained areas the water table is above or near the surface much of the year. The depth of root penetration is limited by the water table.

Most areas are undrained and support low-growing native wetland vegetation. These areas provide habitat for wildlife. Some are used for unimproved pasture. A few areas are drained and are used for crops or pasture. Some areas that were drained and cultivated have reverted to wetland.

Unless it is drained, this soil is generally unsuitable for cultivated crops. If drained, it is suited to corn, soybeans, small grains, vegetables, and mint. In many areas, however, the length of the growing season is severely limited by frost. Also, some areas cannot be drained because they do not have a suitable outlet. Open ditches and tile drains are used to improve internal drainage. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. Drained areas are subject to burning and subsidence. Controlled drainage minimizes the subsidence. Low strength restricts the use of machinery. Soil blowing is a hazard in cultivated areas. It can be controlled by field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop. Applications of lime and fertilizer are needed.

This soil is generally not suited to use as pasture. There are few suitable forage species. Low strength restricts the use of machinery. Cattle hooves cut the soil and damage the plant cover.

Because of the extremely acid soil conditions and the high water table, this soil is generally unsuited to trees. It does not support trees of merchantable size or quality.

Because of the subsidence, the ponding, and the low

strength, this soil is generally unsuitable as a site for septic tank absorption fields and dwellings. Overcoming these limitations is difficult.

This soil is poorly suited to local roads and streets because of the subsidence, the ponding, and the potential for frost action. Subsidence and frost action can be controlled by replacing the organic part of the soil with coarse textured base material, such as sand or gravel. Building the roads on raised fill material and installing culverts help to prevent the damage caused by ponding.

The land capability classification is VIIw, undrained, and IVw, drained. This soil is not assigned a woodland ordination symbol.

MaA—Manawa silt loam, 0 to 3 percent slopes. This deep, nearly level and gently sloping, somewhat poorly drained soil is on low flats, in drainageways and depressions, and on the concave foot slopes of stream and lake terraces. Most areas are irregular in shape and range from 3 to 350 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is brown, mottled, friable silt loam about 5 inches thick. The subsoil is about 33 inches thick. It is reddish brown, mottled, firm silty clay in the upper part and reddish brown, mottled, very firm clay in the lower part. The substratum to a depth of about 60 inches is reddish brown, mottled, very firm silty clay. Some small areas have slopes of more than 3 percent. In places the surface layer is silty clay loam or loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Korobago and Wyeville soils and the poorly drained Poygan soils. Korobago and Wyeville soils are in positions on the landscape similar to those of the Manawa soil. Korobago soils have a loamy mantle 20 to 40 inches thick, and Wyeville soils have a sandy mantle 20 to 40 inches thick. Poygan soils are lower on the landscape than the Manawa soil. Also included are some areas where the soil is subject to flooding. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is slow in the Manawa soil. Available water capacity is moderate. In undrained areas a perched seasonal high water table is 1 to 3 feet below the surface during wet periods. The depth of root penetration is limited by the water table during the wet parts of the growing season. Organic matter content is high in the surface layer. This layer is friable and can be easily tilled. It tends to crust, however, after heavy rains.

Most areas are drained and used for crops. Undrained areas support native vegetation and provide habitat for wildlife. Some of these areas are used for unimproved pasture.

If drained, this soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. A surface drainage system can rapidly remove excess surface water. Open ditches and tile drains improve internal drainage. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. In drained areas crop yields in dry years are somewhat limited by the moderate available water capacity. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

If drained, this soil is suited to legumes and grasses for improved pasture. During dry years forage yields are somewhat limited by the moderate available water capacity. Overgrazing depletes the plant cover and results in an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and reduces the rate of water infiltration. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the clayey soil, the rooting depth, and competing vegetation. Planting and harvesting with wheel-type tractors are limited because of the clayey subsoil. Planting vigorous nursery stock reduces the seedling mortality rate. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields because of the perched water table and the slow permeability. Where the seasonal high water table is at a depth of more than 2 feet, these limitations can be overcome by constructing a mound of suitable filtering material. The soil is poorly suited to dwellings because of the perched water table. This limitation can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness.

This soil is poorly suited to local roads and streets because of low strength and the potential for frost action. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome these limitations.

The land capability classification is IIw in nonirrigated areas. The woodland ordination symbol is 3D.

MeA—Meehan sand, 0 to 3 percent slopes. This deep, nearly level and gently sloping, somewhat poorly drained soil is on low flats, in drainageways and depressions, and on concave foot slopes on outwash plains, on stream terraces, and in basins of glacial lakes. Most areas are irregular in shape and range from 3 to 385 acres in size.

Typically, the surface layer is very dark gray sand about 7 inches thick. The subsurface layer is dark grayish brown and brown, very friable sand about 3 inches thick. The subsoil is brown and dark yellowish brown, mottled, very friable sand about 18 inches thick. The substratum to a depth of about 60 inches is yellowish brown and light yellowish brown, mottled, loose sand. Some small areas have slopes of more than 3 percent. In some places the surface layer is loamy sand. In other places the content of quartz sand is more than 90 percent.

Included with this soil in mapping are small areas of Friendship, Newson, and Wyeville soils. The moderately well drained Friendship soils are higher on the landscape than the Meehan soil, and the poorly drained and very poorly drained Newson soils are lower on the landscape. The somewhat poorly drained Wyeville soils are in positions on the landscape similar to those of the Meehan soil. Wyeville soils are underlain by clayey deposits at a depth of 20 to 40 inches. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is rapid in the Meehan soil. Available water capacity is low. In undrained areas the seasonal high water table is 1 to 3 feet below the surface during wet periods. The depth of root penetration is limited by the water table during the wet parts of the growing season. Organic matter content is low to moderate in the surface layer. This layer is very friable and can be easily tilled.

Many areas are undrained. They are used as native woodland and provide habitat for wildlife. Some of these areas are used for unimproved pasture. Some areas are drained and are used for crops or pasture.

If drained, this soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. In drained areas crop yields in most years are limited by the low available water capacity. This soil is suited to sprinkler irrigation, which can improve productivity. Open ditches and tile drains are used to improve internal drainage. Loose sand enters the tile lines unless a suitable filter is used. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. Soil blowing is a hazard in cultivated areas. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by a winter cover crop. Wind stripcropping and field windbreaks help to prevent the damage to plants caused by windblown sand. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility.

If drained, this soil is suited to legumes and grasses for improved pasture. During most years forage yields are limited by the low available water capacity. A cover of pasture plants is effective in controlling soil blowing. Overgrazing depletes the plant cover and thus results in soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the sandy soil texture, the rooting depth, and competing vegetation. Planting and harvesting with wheel-type tractors are somewhat limited because of the sandy surface layer and subsoil. Planting vigorous nursery stock reduces the seedling mortality rate. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields and dwellings because of the water table. Where the seasonal high water table is at a depth of more than 2 feet, this limitation on sites for septic tank absorption fields can be overcome by constructing a mound of suitable filtering material (fig. 11). The wetness can be controlled on sites for dwellings by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness.

This soil is only moderately suited to local roads and streets because of the water table and the potential for frost action. These limitations can be overcome by installing a subsurface drainage system or by adding fill material, which can raise the road above the level of wetness.

The land capability classification is IVe in irrigated areas and IVw in nonirrigated areas. The woodland ordination symbol is 5W.

Figure 11.—A mounded septic tank absorption field in an area of Meehan sand, 0 to 3 percent slopes.

MnA—Meehan-Newson complex, 0 to 3 percent slopes. The Meehan soil is deep, nearly level and gently sloping, and somewhat poorly drained. It is on low flats, in drainageways and depressions, and on concave foot slopes. The Newson soil is deep, nearly level, and poorly drained and very poorly drained. It is on low flats and in drainageways and depressions. These soils are on outwash plains, on stream terraces, and in basins of glacial lakes. The Newson soil is subject to ponding and, in some areas, to frequent flooding. Individual areas are mainly irregular in shape and range from 3 to more than 1,000 acres in size. They are 40 to 50 percent Meehan soil and 40 to 50 percent Newson soil. The two soils occur as areas so intricately intermingled or so small that mapping them separately was not practical at the scale used.

Typically, the Meehan soil has a surface layer of very dark grayish brown sand about 4 inches thick. The subsoil is about 25 inches thick. It is dark yellowish brown and brown, mottled, very friable sand. The substratum to a depth of about 60 inches is light yellowish brown, mottled, loose sand. Some small areas have slopes of more than 3 percent. In places the surface layer is loamy sand, fine sand, loamy fine sand, fine sandy loam, or loam.

Typically, the Newson soil has a surface layer of black mucky loamy sand about 3 inches thick. The subsurface layer is black, very friable loamy sand about

5 inches thick. The subsoil is about 14 inches thick. It is dark grayish brown, mottled, very friable sand in the upper part and grayish brown, mottled, loose sand in the lower part. The substratum to a depth of about 60 inches is yellowish brown, mottled, loose sand. Some small areas have slopes of more than 2 percent. In some places the surface layer is entirely loamy sand, sand, or fine sandy loam. In other places the soil has an organic surface layer as much as 15 inches thick or a loamy mantle as much as 20 inches thick. In some small areas the soil has thin strata of loam or sandy loam in the subsoil.

Included with these soils in mapping are small areas of the very poorly drained Dawson soils and the moderately well drained Friendship soils. Dawson soils are lower on the landscape than the Meehan soil and are in landscape positions similar to those of the Newson soil. Dawson soils have an organic layer 16 to 51 inches thick. Friendship soils are higher on the landscape than the Meehan and Newson soils. Also included are a few small areas that are loamy or clayey in the lower part of the substratum. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is rapid in the Meehan and Newson soils. Available water capacity is low. In undrained areas the seasonal high water table is 1 to 3 feet below the surface of the Meehan soil and is above or near the surface of the Newson soil much of the year. The depth of root penetration is limited by the water table during the wet parts of the growing season.

Most areas are undrained and are used as native woodland and provide habitat for wildlife. Some are used as unimproved pasture. Some areas are drained and used for crops or pasture. A few areas are used for cranberry bogs. Many areas that were drained and cultivated now support native vegetation or have been planted to pine.

If drained, these soils are suited to corn, soybeans, and small grain and to legumes and grasses for hay. In drained areas crop yields in most years are limited by the low available water capacity. These soils are suited to sprinkler irrigation, which can improve productivity. Areas of the Newson soil that are subject to flooding can be protected by dikes or diversions. A surface drainage system can rapidly remove excess surface water. Open ditches and tile drains improve internal drainage. Loose sand enters the tile lines unless a suitable filter is used. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. Where cultivated crops are grown, soil blowing is a hazard. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by a winter cover crop. Wind stripcropping and field windbreaks help to prevent the damage to plants caused by windblown sand. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility.

If drained, these soils are suited to legumes and grasses for improved pasture. During most years forage yields are limited by the low available water capacity. A cover of pasture plants is effective in controlling soil blowing. Overgrazing depletes the plant cover and thus results in soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

These soils are suited to trees. The problems in managing forest are the sandy soil texture, the water table in the Newson soil, and competing vegetation. Wetness during the planting season generally limits reforestation on the Newson soil to natural regeneration, and harvesting is frequently limited to periods when the soil is frozen. On the Meehan soil, planting and harvesting with wheel-type tractors are somewhat limited because of the sandy surface layer and subsoil. Planting vigorous nursery stock reduces the seedling mortality rate. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical preparation.

The Meehan soil is poorly suited to septic tank absorption fields and dwellings because of the water table. Where the seasonal high water table is at a depth of more than 2 feet, this limitation on sites for septic tank absorption fields can be overcome by constructing a mound of suitable filtering material. The wetness can be controlled on sites for dwellings by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness.

The Newson soil is generally unsuited to septic tank absorption fields and to dwellings because of the ponding and, in some areas, because of the flooding (fig. 12). Overcoming these limitations is difficult.

The Meehan soil is moderately suited to local roads and streets because of the water table and the potential for frost action. The Newson soil is poorly suited to this use because of the ponding and, in some areas, because of the flooding. Installing a subsurface drainage system lowers the water table. Fill material

Figure 12.—Spring flooding on the Newson soil in the Meehan-Newson complex, 0 to 3 percent slopes.

can raise the road above the level of flooding and wetness. Large culverts permit flood water to drain away more rapidly.

The land capability classification is VIw, undrained, and IVw, drained, in irrigated and nonirrigated areas. The woodland ordination symbol assigned to the Meehan soil is 5W, and that assigned to the Newson soil is 6W.

MrB—Meridian loam, 2 to 6 percent slopes. This deep, gently sloping, well drained soil is on the convex side slopes of stream and lake terraces. Most areas are irregular in shape and range from 3 to 20 acres in size.

Typically, the surface layer is dark brown loam about 7 inches thick. The subsoil is about 32 inches thick. It is dark yellowish brown and brown, friable loam in the upper part and strong brown, very friable sandy loam

and loamy sand in the lower part. The substratum to a depth of about 60 inches is reddish yellow, loose sand. Some areas are eroded. Other areas have slopes of less than 2 percent or more than 6 percent. In some places the surface layer is sandy loam or silt loam. In other places the substratum has thin strata of sandy loam or loam or the content of gravel is as much as 35 percent.

Included with this soil in mapping are small areas of Billett, Eleva, Gale, and Jackson soils. The well drained and moderately well drained Billett soils are in positions on the landscape similar to or slightly lower than those of the Meridian soil. They have less clay in the subsoil than the Meridian soil. The somewhat excessively drained Eleva soils and the well drained Gale soils are in positions on the landscape similar to those of the Meridian soil. They are underlain by sandstone at a depth of 20 to 40 inches. Eleva soils have less clay and more sand in the subsoil than the Meridian soil, and Gale soils have less sand and more silt in the subsoil. The moderately well drained Jackson soils are slightly lower on the landscape than the Meridian soil. They are 45 to 60 inches deep over sandy deposits. They have more silt and less sand in the subsoil than the Meridian soil. Also included are small severely eroded areas of Meridian loam and small areas that are 40 to 60 inches deep over clayey deposits. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderate in the subsoil of the Meridian soil and rapid in the substratum. Available water capacity is moderate. The depth of root penetration is limited by the underlying sand. Organic matter content is moderate in the surface layer. This layer is friable and can be easily tilled.

Most areas are used for crops or pasture. Some areas are used as native woodland and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During dry years crop yields are somewhat limited by the moderate available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. If the soil is cultivated, the hazard of water erosion is slight or moderate. Water erosion can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. During dry years forage yields are somewhat limited by the moderate available water capacity. A cover of pasture plants is effective in controlling water erosion. Overgrazing depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and increases the runoff rate and the hazard of erosion. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. Competing vegetation, which interferes with natural regeneration or the establishment of planted seedlings, can be controlled by suitable herbicides or can be removed by mechanical means.

This soil readily absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity can result in the pollution of ground water. The soil is suited to dwellings. It is only moderately suited to local roads and streets because of the potential for frost action. This limitation can be controlled by covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel.

The land capability classification is IIe in irrigated and nonirrigated areas. The woodland ordination symbol is 4A.

NaB—NewGlarus silt loam, 2 to 6 percent slopes. This moderately deep, gently sloping, well drained soil is on the convex ridgetops of uplands underlain by dolomite bedrock. Most areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsoil is about 30 inches thick. It is dark yellowish brown, firm silt loam and silty clay loam in the upper part and dark yellowish brown, dark brown, and yellowish red, very firm silty clay in the lower part. Light yellowish brown dolomite bedrock is at a depth of about 38 inches. Some small areas have slopes of less than 2 percent or more than 6 percent. Some areas are eroded. In some areas the surface layer is silty clay loam. Other areas have a silty mantle less than 15 inches thick or have less than 6 inches of clayey residuum. In places the depth to dolomite bedrock is more than 40 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Reedsburg soils and the well drained Wildale soils. Reedsburg and Wildale soils are in positions on the landscape similar to those of the

NewGlarus soil. They are underlain by clayey residuum to a depth of at least 60 inches. Wildale soils have a silty mantle less than 15 inches thick. Also included are small severely eroded areas of NewGlarus silt loam, small areas where the depth to dolomite bedrock is less than 20 inches, small areas where stones are on the surface, and small areas where the underlying bedrock is sandstone. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderate or moderately slow in the silty upper part of the subsoil of the NewGlarus soil and slow in the clayey residuum. Available water capacity is moderate. The depth of root penetration is limited by the underlying dolomite bedrock. Organic matter content is moderately low or moderate in the surface layer. This layer is friable and can be easily tilled. It tends to crust, however, after heavy rains.

Most areas are used for crops or pasture. Some areas are used as native woodland and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During dry years crop yields are somewhat limited by the moderate available water capacity. If the soil is cultivated, the hazard of water erosion is slight or moderate. Water erosion can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. During dry years forage yields are somewhat limited by the moderate available water capacity. A cover of pasture plants is effective in controlling water erosion. Overgrazing depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and increases the runoff rate and the hazard of erosion. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the rooting depth and competing vegetation. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields because of the depth to bedrock and the moderately slow and slow permeability. These limitations can be overcome by constructing a mound of suitable filtering material. The soil is only moderately suited to dwellings because of the shrink-swell potential. Shrinking and swelling can be overcome by adding coarse textured material, such as sand or gravel, under and around the basement or under the footings and concrete slab.

This soil is poorly suited to local roads and streets because of low strength and the potential for frost action. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome these limitations.

The land capability classification is IIe in nonirrigated areas. The woodland ordination symbol is 3D.

NaC2—NewGlarus silt loam, 6 to 12 percent slopes, eroded. This moderately deep, sloping, well drained soil is on the convex ridgetops of uplands underlain by dolomite bedrock. Most areas are irregular in shape and range from 3 to 35 acres in size.

In most cultivated areas, some of the original surface layer has been removed through water erosion. Typically, the remaining surface layer is about 8 inches thick. It is dark brown silt loam that has been intermingled with some dark yellowish brown silt loam by plowing. The subsoil is about 29 inches thick. It is dark yellowish brown, firm silt loam and silty clay loam in the upper part and brown, very firm clay in the lower part. Light yellowish brown dolomite bedrock is at a depth of about 37 inches. Some areas are uneroded. Other areas have slopes of less than 6 percent or more than 12 percent. In some places the surface layer is silty clay loam. Other places have a silty mantle less than 15 inches thick or have less than 6 inches of clayey residuum. In places the depth to dolomite bedrock is more than 40 inches.

Included with this soil in mapping are small areas of the well drained Wildale soils. They are in positions on the landscape similar to those of the NewGlarus soil. Wildale soils are underlain by clayey residuum to a depth of at least 60 inches. They have a silty mantle less than 15 inches thick. Also included are small severely eroded areas of NewGlarus silt loam, small areas where stones are on the surface, areas of somewhat poorly drained soils, areas where the depth to dolomite bedrock is less than 20 inches, and areas

where the underlying bedrock is sandstone. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderate or moderately slow in the silty upper part of the subsoil of the NewGlarus soil and slow in the clayey residuum. Available water capacity is moderate. The depth of root penetration is limited by the underlying dolomite bedrock. Organic matter content is moderately low or moderate in the surface layer. This layer tends to crust after heavy rains and in most cultivated areas readily forms clods if tilled when wet. This is a result of past mixing of firm silt loam from the subsoil into the plow layer.

Some areas are used for crops or pasture. Some areas are used as native woodland and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During dry years crop yields are somewhat limited by the moderate available water capacity. The available water capacity and the depth of root penetration have been reduced by erosion in most cultivated areas. If the soil is cultivated, further water erosion is a moderate hazard. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. During dry years forage yields are somewhat limited by the moderate available water capacity. A cover of pasture plants is effective in controlling water erosion. Overgrazing depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and increases the runoff rate and the hazard of erosion. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the rooting depth and competing vegetation. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields because of the depth to bedrock and the moderately slow and slow permeability. These limitations can be overcome by constructing a mound of suitable filtering material. The soil is only moderately suited to dwellings because of the slope and the shrink-swell potential. The buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas, but the underlying bedrock can limit the depth of cuts. Shrinking and swelling can be overcome by adding coarse textured material, such as sand or gravel, under and around the basement or under the footings and concrete slab.

This soil is poorly suited to local roads and streets because of low strength and the potential for frost action. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome these limitations.

The land capability classification is IIIe in nonirrigated areas. The woodland ordination symbol is 3D.

Ne—Newson mucky loamy sand, 0 to 2 percent slopes. This deep, nearly level, poorly drained and very poorly drained soil is on low flats and in drainageways and depressions on outwash plains, on stream terraces, and in basins of glacial lakes. It is subject to frequent flooding and ponding. Most areas are irregular in shape and range from 3 to 150 acres in size.

Typically, the surface layer is black mucky loamy sand and very dark gray loamy sand about 7 inches thick. The subsoil is dark grayish brown and grayish brown, mottled, very friable loamy sand about 20 inches thick. The substratum to a depth of about 60 inches is yellowish brown, mottled, loose sand. Some areas have slopes of more than 2 percent. In some places the surface layer is loamy sand or sand. In other places it is an organic layer as much as 15 inches thick.

Included with this soil in mapping are small areas of Dawson, Meehan, and Wautoma soils. The very poorly drained Dawson soils and the poorly drained and very poorly drained Wautoma soils are in landscape positions similar to those of the Newson soil. Dawson soils have an organic layer 16 to 51 inches thick. Wautoma soils have 20 to 40 inches of sandy deposits underlain by clayey deposits. The somewhat poorly drained Meehan soils are slightly higher on the landscape than the Newson soil. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is rapid in the Newson soil. Available water capacity is low. In undrained areas the seasonal high water table is above or near the surface much of the year. The depth of root penetration is limited by the

water table. Organic matter content is high or very high in the surface layer. This layer is very friable and can be easily tilled.

Most areas are undrained and support native wetland vegetation. These areas provide habitat for wildlife. Some of these areas are used for unimproved pasture. Some areas are drained and are used for crops or pasture.

Unless it is drained, this soil is generally unsuitable for cultivated crops. If drained and protected from flooding, it is suited to corn, soybeans, and small grain and to legumes and grasses for hay. In drained areas crop yields in most years are limited by the low available water capacity. This soil is suited to sprinkler irrigation, which can improve productivity. Dikes and diversions can be used to prevent flooding. A surface drainage system can rapidly remove excess surface water. Open ditches and tile drains improve internal drainage. Loose sand enters the tile lines unless a suitable filter is used. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. Where cultivated crops are grown, soil blowing is a hazard. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by a winter cover crop. Wind stripcropping and field windbreaks help to prevent the damage to plants caused by windblown sand. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility.

This soil is unsuitable for most forage species unless it is drained. Legumes and grasses can be grown for improved pasture in drained areas. During most years forage yields are limited by the low available water capacity. A cover of pasture plants is effective in controlling soil blowing. Overgrazing depletes the plant cover and thus results in soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the water table and competing vegetation. Wetness during the planting season generally limits reforestation to natural regeneration. Harvesting is frequently limited to periods when the soil is frozen. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical preparation.

This soil is generally unsuited to septic tank absorption fields and to dwellings because of the ponding and, in most areas, because of the flooding. Overcoming these limitations is difficult.

This soil is poorly suited to local roads and streets because of the ponding and, in most areas, because of the flooding. Installing a subsurface drainage system lowers the water table. Fill material can raise the road above the level of flooding and wetness. Large culverts permit floodwater to drain away more rapidly.

The land capability classification is VIw, undrained, and IVw, drained, in irrigated and nonirrigated areas. The woodland ordination symbol is 6W.

Ns—Newson-Dawson complex, 0 to 2 percent slopes. These deep, nearly level soils are on low flats and in drainageways and depressions on outwash plains, on stream terraces, and in basins of glacial lakes. The Newson soil is poorly drained and very poorly drained and is subject to frequent flooding and ponding. The Dawson soil is very poorly drained and is subject to ponding. Individual areas are mainly irregular in shape and range from 3 to more than 1,000 acres in size. They are 55 to 65 percent Newson soil and 30 to 40 percent Dawson soil. The two soils occur as areas so intricately intermingled or so small that mapping them separately was not practical at the scale used.

Typically, the Newson soil has a surface layer of black mucky loamy sand about 7 inches thick. The subsoil is dark grayish brown and light brownish gray, mottled, very friable and loose loamy sand about 19 inches thick. The substratum to a depth of about 60 inches is light gray, mottled, loose sand. In some areas the surface layer is loamy sand or sand. In other areas it is an organic layer of muck 15 inches thick.

Typically, the upper 37 inches of the Dawson soil is black and very dark brown muck. The substratum to a depth of about 60 inches is dark grayish brown, loose sand. In some areas the surface layer is mucky peat. In other areas sandy or loamy layers are in the organic materials. In places loamy layers are in the underlying sand.

Included with these soils in mapping are small areas of the very poorly drained Loxley soils and the somewhat poorly drained Meehan soils. Loxley soils are in landscape positions similar to those of the Dawson soil. They are slightly lower on the landscape than the Newson soil. They are organic to a depth of more than 51 inches. Meehan soils are higher on the landscape than the Newson and Dawson soils. They are sandy throughout. Also included are a few small areas where the substratum is loamy or clayey throughout or in the lower part. Included soils make up 5 to 10 percent of individual mapped areas.

Figure 13.—Cranberry beds under construction in an area of Newson-Dawson complex, 0 to 2 percent slopes.

Permeability is rapid in the Newson soil. Available water capacity is low. In undrained areas the seasonal high water table is above or near the surface much of the year. The depth of root penetration is limited by the water table.

Permeability is moderately slow to moderately rapid in the organic layer of the Dawson soil and rapid in the substratum. Available water capacity is very high. In undrained areas the seasonal high water table is above or near the surface much of the year. The depth of root penetration is limited by the water table and by the underlying sand.

Most areas are undrained and support low-growing native wetland vegetation. A few drained areas are used for crops or pasture, and a few are used for cranberries (fig. 13). Many areas that were drained and

cultivated now support native vegetation or have been planted to pine.

Unless they are drained, these soils are generally unsuitable for cultivated crops. If drained and protected from flooding, they are suited to corn, soybeans, small grain, vegetables, and mint. The soils are suited to sprinkler irrigation, which can improve productivity. In most areas the length of the growing season is severely limited by frost. Also, some areas cannot be drained because they do not have a suitable outlet. Areas of the Newson soil that are subject to flooding can be protected by dikes or diversions. A surface drainage system can rapidly remove excess surface water. Open ditches and tile drains improve internal drainage. Loose sand can enter the tile lines unless a suitable filter is used. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. Drained areas of the Dawson soil are subject to burning and subsidence. Controlled drainage minimizes the subsidence. Low strength restricts the use of machinery. Soil blowing is a hazard in cultivated areas. It can be controlled by field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop. Applications of lime and fertilizer are needed.

These soils are generally not suited to use as pasture. Few forage species are suited to the Dawson soil. Also, the low strength restricts the use of machinery. Cattle hooves cut the soil and damage the plant cover.

The Newson soil is suited to trees. The problems in managing forest are the water table and competing vegetation. Wetness during the planting season generally limits reforestation to natural regeneration. Harvesting is frequently limited to periods when the soil is frozen. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical preparation. Because of the extremely acid soil conditions and the high water table, the Dawson soil is generally unsuited to trees. It does not support trees of merchantable size or quality.

These soils are generally unsuited to septic tank absorption fields because of the flooding on the Newson soil, the subsidence in the Dawson soil, and the ponding on both soils. They are generally unsuited to dwellings because of the flooding on the Newson soil, the subsidence and the low strength in the Dawson soil, and the ponding on both soils. Overcoming these limitations is difficult.

These soils are poorly suited to local roads and streets because of the flooding on the Newson soil, the subsidence and the potential fo- frost action on the Dawson soil, and the ponding on both soils. Building the roads on raised fill material and installing large culverts help to prevent the damage caused by flooding and ponding. Subsidence and frost action can be controlled by replacing the organic part of the soil with coarse textured base material, such as sand or gravel.

The land capability classification is VIIw, undrained, and IVw, drained, in irrigated and nonirrigated areas. The woodland ordination symbol assigned to the Newson soil is 6W. The Dawson soil is not assigned a woodland ordination symbol.

OrA—Orion silt loam, 0 to 3 percent slopes. This deep, nearly level and gently sloping, somewhat poorly drained soil is on flood plains. It is subject to frequent flooding. Most areas are long and narrow and range from 3 to 150 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 10 inches thick. The substratum to a depth of about 34 inches is brown, mottled, friable silt loam. The next layer is a buried surface layer about 19 inches thick. It is black, mottled, friable silt loam in the upper part and very dark gray, mottled, firm silty clay loam in the lower part. The substratum to a depth of about 60 inches is dark gray, mottled, very friable loamy fine sand. Some small areas have slopes of more than 3 percent. In some places the surface layer is loam or sandy loam. In other places the depth to the buried dark surface layer is less than 20 inches or more than 40 inches.

Included with this soil in mapping are small areas of the poorly drained and very poorly drained Ettrick soils. These soils are lower on the landscape than the Orion soil. Also, they have more clay and less silt in the profile. Also included are small areas where the surface layer is sand or loamy sand, areas where stones and boulders are on the surface, and areas where the content of gravel in the soil is more than 35 percent. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderate in the Orion soil. Available water capacity is very high. In undrained areas the seasonal high water table is 1 to 3 feet below the surface during wet periods. The depth of root penetration is limited by the water table during the wet parts of the growing season. Organic matter content is moderately low or moderate in the surface layer. This layer is friable and can be easily tilled.

Most areas are undrained and support native vegetation. These areas provide habitat for wildlife and

are used as unimproved pasture. Some areas are used as woodland. Some are drained and are used for crops or pasture.

If drained and protected from flooding, this soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. Dikes and diversions can be used to prevent flooding. A surface drainage system can rapidly remove excess surface water. Open ditches and tile drains improve internal drainage. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

If drained, this soil is suited to legumes and grasses for improved pasture. Overgrazing, however, depletes the plant cover and results in an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and reduces the rate of water infiltration. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the flooding and competing vegetation. Planting and harvesting are limited by periods of flooding. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is generally unsuited to septic tank absorption fields and dwellings because of the flooding and the water table. Overcoming these limitations is difficult.

This soil is poorly suited to local roads and streets because of low strength, the flooding, and the potential for frost action. Covering or replacing the upper part of the soil with a coarse textured fill material, such as sand or gravel, helps to overcome low strength and frost action. Fill material can raise the roads above the level of flooding. Large culverts permit the floodwater to drain away more rapidly.

The land capability classification is IIIw in nonirrigated areas. The woodland ordination symbol is 2W.

Pa—Palms muck, 0 to 1 percent slopes. This deep, nearly level, very poorly drained soil is on low flats and in drainageways and depressions on stream and lake terraces. It is subject to ponding. Most areas are irregular in shape and range from 3 to 65 acres in size.

Typically, the upper 38 inches is black muck. The substratum to a depth of about 60 inches is dark gray, firm silt loam. In some areas the slope is more than 2 percent, and in other areas the organic layer is less than 16 inches thick. In places the substratum is clayey.

Included with this soil in mapping are small areas of Dawson, Loxley, Newson, and Poygan soils. The very poorly drained Dawson and Loxley soils, the poorly drained and very poorly drained Newson soils, and the poorly drained Poygan soils are in positions on the landscape similar to those of the Palms soil. Dawson soils have a sandy substratum. Loxley soils are organic to a depth of more than 51 inches. Newson soils are sandy throughout. Poygan soils formed dominantly in clayey deposits. Also included are small areas that are subject to flooding. Included areas make up 10 to 15 percent of individual mapped areas.

Permeability is moderately slow to moderately rapid in the organic layer of the Palms soil and moderately slow or moderate in the substratum. Available water capacity is very high. In undrained areas the water table is above or near the surface much of the year. The depth of root penetration is limited by the water table.

Most areas are undrained and support native wetland vegetation. These areas provide habitat for wildlife. Some are used as unimproved pasture. Some areas are drained and are used for crops or pasture.

Unless it is drained, this soil is generally unsuitable for cultivated crops. If drained, it is suited to corn, soybeans, small grain, vegetables, and mint. In many areas, however, the length of the growing season is severely limited by frost. Also, some areas cannot be drained because they do not have a suitable outlet. Open ditches and tile drains are used to improve internal drainage. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. Drained areas are subject to burning and subsidence. Low strength restricts the use of machinery. Soil blowing is a hazard in cultivated areas. It can be controlled by field windbreaks, wind stripcropping, a cover of crop residue, and a winter cover crop. Applications of lime and fertilizer are needed.

This soil is unsuitable for most forage species unless it is drained. If drained, it is suited to certain legumes and grasses for improved pasture. Low strength restricts the use of machinery. Cattle hooves cut the soil and damage the plant cover.

This soil is suited to trees. The problems in managing forest are the water table and competing vegetation. Wetness during the planting season generally limits reforestation to natural regeneration. Harvesting is frequently limited to periods when the soil

is frozen. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

Because of the subsidence, the ponding, and the low strength, this soil is generally unsuitable as a site for septic tank absorption fields and dwellings. Overcoming these limitations is difficult.

This soil is poorly suited to local roads and streets because of the subsidence, the ponding, and the potential for frost action. Subsidence and frost action can be controlled by replacing the organic part of the soil with coarse textured base material, such as sand or gravel. Building the roads on raised fill material and installing culverts help to prevent the damage caused by ponding.

The land capability classification is Vw, undrained, and IIIw, drained. The woodland ordination symbol is 2W.

PbA—Partridge loamy fine sand, 0 to 3 percent slopes. This moderately deep, nearly level and gently sloping, somewhat poorly drained soil is on flats and concave foot slopes and in drainageways and depressions on outwash plains, stream terraces, and some nearby uplands. Some areas of this soil are subject to occasional flooding. Most areas are irregular in shape and range from 3 to 200 acres in size.

Typically, the surface layer is black loamy fine sand about 3 inches thick. The subsoil is about 13 inches thick. It is dark grayish brown, mottled, very friable loamy fine sand in the upper part and light olive brown, mottled, very friable fine sand in the lower part. The substratum to a depth of about 23 inches is light yellowish brown, mottled, loose fine sand. Dark yellowish brown and brown sandstone is at a depth of about 23 inches. Some small areas have slopes of more than 3 percent. In places the surface layer is sand, loamy sand, or fine sandy loam. In some small areas the content of gravel is as much as 35 percent in the soil. In other areas the depth to sandstone is more than 40 inches.

Included with this soil in mapping are small areas of Friendship, Hixton Variant, Newson, and Plainbo soils. The moderately well drained Friendship soils are higher on the landscape than the Partridge soil, and the poorly drained and very poorly drained Newson soils are lower on the landscape. Friendship and Newson soils formed in 60 inches or more of sandy deposits. The somewhat poorly drained Hixton Variant soils are in positions on the landscape similar to those of the Partridge soil. They have more silt and clay and less sand in the solum than the Partridge soil. The excessively drained Plainbo soils are higher on the landscape than the Partridge soil. Also included are areas where the depth to sandstone is less than 20 inches and areas of moderately deep sandy soils that are poorly drained or moderately well drained. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is rapid in the Partridge soil. Available water capacity is very low. In undrained areas a perched seasonal high water table is 1 to 3 feet below the surface during wet periods. The depth of root penetration is limited by the water table during the wet parts of the growing season or by the underlying sandstone. Organic matter content is very low or low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are undrained. They are used mostly as native woodland and provide habitat for wildlife. Some of these areas are used for unimproved pasture. Some areas are drained and used for crops or pasture.

If drained, this soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. Areas that are subject to flooding can be protected by dikes or diversions. A surface drainage system can rapidly remove excess surface water. Open ditches and tile drains improve internal drainage, but the underlying bedrock can limit the depth of cuts. Loose sand enters the tile lines unless a suitable filter is used. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. In drained areas crop yields are limited by the very low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. Soil blowing is a hazard in cultivated areas. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by a winter cover crop. Wind stripcropping and field windbreaks help to prevent the damage to plants caused by windblown sand. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility.

If drained, this soil is suited to legumes and grasses for improved pasture. Forage yields are limited by the very low available water capacity. A cover of pasture plants is effective in controlling soil blowing. Overgrazing depletes the plant cover and thus results in soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the sandy soil texture, the water table, and competing vegetation. Planting and harvesting with wheel-type tractors are somewhat limited because of the sandy lower part of the subsoil and substratum. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical preparation.

This soil is poorly suited to septic tank absorption fields because of the depth to bedrock and the perched water table and, in some areas, because of the flooding. The sandy substratum and sandstone do not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. Where the seasonal high water table is at a depth of more than 2 feet and the area is not subject to flooding, the depth to bedrock and the wetness can be overcome by constructing a mound of suitable filtering material. The soil is poorly suited to dwellings because of the perched water table and, in some areas, because of the flooding. The wetness can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness. The areas on flood plains should not be used as sites for septic tank absorption fields or dwellings.

Because of the flooding in some areas, this soil is poorly suited to local roads and streets. Building the roads on raised fill material and installing large culverts help to prevent the damage caused by flooding.

The land capability classification is IVw. The woodland ordination symbol is 6D.

Pc—Pits. These are areas where sand, sandstone, dolomite bedrock, or, in one instance, quartzite bedrock has been removed. Individual areas are irregular in shape and range from 3 to 50 acres in size.

Pits are in or near areas of Boone, Eleva, Elkmound, Friendship, Gale, La Farge, Meehan, NewGlarus, Newson, Plainbo, Plainfield, Urne, or Wildale soils.

Typically, the material in the bottom and sidewalls of the excavation is sand, sandstone, or dolomite bedrock.

Included with this unit in mapping are areas of spoil, which includes soil pushed from the pit area before excavation. Also included are small areas of water.

Some areas of this unit are sites of active excavation. Other areas have been abandoned and are covered by trees, brush, and weeds. The main management concern is reclamation of the area after excavation. This generally involves land shaping and the addition of topsoil suitable for plants.

Determining the suitability of this unit for septic tank absorption fields, dwellings with or without basements, and local roads and streets requires onsite investigation.

No land capability classification or woodland ordination symbol is assigned.

PdB—Plainbo sand, 1 to 6 percent slopes. This moderately deep, nearly level and gently sloping, excessively drained soil is on flats and convex side slopes on outwash plains, stream terraces, and some nearby uplands. Most areas are irregular in shape and range from 3 to more than 1,000 acres in size.

Typically, the surface layer is black sand about 3 inches thick. The subsoil is about 18 inches thick. It is brown and strong brown, very friable sand in the upper part and brown, very friable fine sand in the lower part. The substratum is yellowish brown, loose fine sand about 3 inches thick. Yellowish brown and very pale brown, partly consolidated sandstone is at a depth of about 24 inches. Some areas have slopes of less than 1 percent or more than 6 percent. In some areas the surface layer is fine sand, loamy sand, or loamy fine sand. Some small areas are eroded, commonly as a result of soil blowing. In places the depth to sandstone is more than 40 inches. In some areas the content of quartz sand is more than 90 percent. In other areas the content of gravel is as much as 35 percent.

Included with this soil in mapping are small areas of Eleva, Elkmound, Partridge, and Plainfield soils. The somewhat excessively drained Eleva soils and the well drained Elkmound soils are in positions on the landscape similar to those of the Plainbo soil. They have more silt and clay and less sand than the Plainbo soil. Elkmound soils are 10 to 20 inches deep over sandstone. The somewhat poorly drained Partridge soils are lower on the landscape than the Plainbo soil. The excessively drained Plainfield soils are in positions on the landscape similar to those of the Plainbo soil. They formed in more than 60 inches of sandy deposits. Also included are small areas of Plainbo sand that are severely eroded, commonly as a result of soil blowing; small areas where stones are on the surface; areas of sandy soils where the depth to sandstone is less than 20 inches; and small areas that have loamy layers as thick as 6 inches in the lower part of the substratum. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is rapid in the Plainbo soil. Available water capacity is very low. The depth of root penetration is limited by the underlying sandstone.

Organic matter content is low or very low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used as native woodland and provide habitat for wildlife. Some areas are used for crops or pasture. Many areas that were cultivated have reverted to native woodland or have been planted to pine.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. Crop yields are limited by the very low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. If cultivated crops are grown, water erosion is a slight hazard. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by a winter cover crop. Water erosion also can be controlled by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Wind stripcropping and field windbreaks help to prevent the damage to plants caused by windblown sand. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility.

This soil is suited to legumes and grasses for improved pasture. Forage yields are limited by the very low available water capacity. A cover of pasture plants is effective in controlling water erosion and soil blowing. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the sandy soil texture and the rooting depth. Planting and harvesting with wheel-type tractors are somewhat limited because of the sandy soil texture. Planting vigorous nursery stock reduces the seedling mortality rate. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees.

This soil is poorly suited to septic tank absorption fields. It is limited by the depth to bedrock. The sandy soil and the sandstone do not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. These limitations can be overcome by constructing a mound of suitable filtering material.

This soil is suited to dwellings and to local roads and streets.

The land capability classification is IIIe in irrigated areas and IVs in nonirrigated areas. The woodland ordination symbol is 5D.

PdC—Plainbo sand, 6 to 12 percent slopes. This moderately deep, sloping, excessively drained soil is on convex side slopes on outwash plains, stream terraces, and some nearby uplands. Most areas are irregular in shape and range from 3 to 170 acres in size.

Typically, the surface layer is very dark grayish brown sand about 2 inches thick. The subsoil is about 13 inches thick. It is strong brown, very friable fine sand in the upper part and yellowish brown, very friable sand in the lower part. The substratum is yellowish brown, loose sand about 15 inches thick. Strong brown, partly consolidated sandstone is at a depth of about 30 inches. Some small areas are eroded. Some areas have slopes of less than 6 percent or more than 12 percent. In some areas the surface layer is fine sand or loamy sand. In other areas the depth to sandstone is more than 40 inches. In some places the content of quartz sand is more than 90 percent. In other places the content of gravel is as much as 35 percent throughout.

Included with this soil in mapping are small areas of the somewhat excessively drained Eleva soils and the excessively drained Plainfield soils. Eleva and Plainfield soils are in positions on the landscape similar to those of the Plainbo soil. Eleva soils have more silt and clay and less sand than the Plainbo soil. Plainfield soils formed in more than 60 inches of sandy deposits. Also included are small severely eroded areas of Plainbo sand, small areas where the depth to sandstone is less than 20 inches, areas where stones are on the surface, and small areas that have loamy layers as much as 6 inches thick in the lower part of the substratum. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is rapid in the Plainbo soil. Available water capacity is very low. The depth of root penetration is limited by the underlying sandstone. Organic matter content is low or very low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used as native woodland and provide habitat for wildlife. A few areas are used for crops or pasture. Many areas that were cultivated have reverted naturally to native woodland or have been planted to pine.

This soil is generally unsuitable for crop production. Crop yields are limited by the very low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity, but irrigation water is difficult to apply uniformly. If cultivated crops are grown, water erosion is a moderate hazard. Soil blowing also is a hazard.

This soil is suited to legumes and grasses for

improved pasture. Forage yields are limited by the very low available water capacity. A cover of pasture plants is effective in controlling water erosion and soil blowing. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the sandy soil texture and the rooting depth. Planting and harvesting with wheel-type tractors are somewhat limited because of the sandy soil texture. Planting vigorous nursery stock reduces the seedling mortality rate. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees.

This soil is poorly suited to septic tank absorption fields. It is limited by the depth to bedrock. The sandy soil and the sandstone do not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. These limitations can be overcome by constructing a mound of suitable filtering material.

This soil is only moderately suited to dwellings and to local roads and streets because of the slope. The buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas, but the underlying bedrock can limit the depth of cuts. Building the roads and streets on the contour or cutting and filling help to overcome the slope, but the underlying bedrock can limit the depth of cuts.

The land capability classification is IVe in irrigated areas and VIs in nonirrigated areas. The woodland ordination symbol is 5D.

PfB—Plainfield sand, 1 to 6 percent slopes. This deep, nearly level and gently sloping, excessively drained soil is on flats and convex side slopes on outwash plains, stream terraces, and uplands and in basins of glacial lakes. Most areas are irregular in shape and range from 3 to 350 acres in size.

Typically, the surface layer is very dark grayish brown sand about 8 inches thick. The subsoil is dark yellowish brown, very friable sand about 14 inches thick. The substratum to a depth of about 60 inches is yellowish brown and light yellowish brown, loose sand. Some areas are eroded, commonly as a result of soil blowing. In some small areas the slope is less than 1 percent or more than 6 percent. In other small areas the surface layer is loamy sand. In some places the content of quartz sand is more than 90 percent. In other places the content of gravel and cobbles is as much as 35 percent throughout.

Included with this soil in mapping are small areas of Friendship and Plainbo soils. The moderately well drained Friendship soils are slightly lower on the landscape than the Plainfield soil. The excessively drained Plainbo soils are in positions on the landscape similar to those of the Plainfield soil. They have sandstone at a depth of 20 to 40 inches. Also included are small areas of Plainfield sand that are severely eroded, commonly as a result of soil blowing. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is rapid in the Plainfield soil. Available water capacity is low. Organic matter content is moderately low or low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used for crops or pasture. Some are used as native woodland and provide habitat for wildlife. Many areas that were cultivated have reverted to native woodland or have been planted to pine.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During most years, however, crop yields are limited by the low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. If the soil is cultivated, the hazard of water erosion is slight. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by a winter cover crop. Water erosion also can be controlled by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Wind stripcropping and field windbreaks help to prevent the damage to plants caused by windblown sand. Applications of lime and fertilizer are necessary. Regular additions of manure help to maintain fertility.

If irrigated, this soil is suited to vegetable crops, such as sweet corn, peas, potatoes, and snap beans (fig. 14). Because of the rapid permeability, the irrigation rate should be limited. Limiting the irrigation rate helps to prevent the leaching of plant nutrients and other chemicals out of the root zone and eventually into the underlying ground water.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years forage yields are limited by the low available water capacity. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and

Figure 14.—Recently emerged snap beans in an irrigated area of Plainfield sand, 1 to 6 percent slopes.

an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The main problem in managing forest is the sandy soil texture. Planting and harvesting with wheel-type tractors are somewhat limited because of the sandy soil texture. Planting vigorous nursery stock reduces the seedling mortality rate.

This soil is suited to dwellings and to local roads and streets. It readily absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity can result in the pollution of ground water.

The land capability classification is IIIe in irrigated areas and IVs in nonirrigated areas. The woodland ordination symbol is 8S.

PfC—Plainfield sand, 6 to 12 percent slopes. This deep, sloping, excessively drained soil is on convex side slopes on outwash plains, stream terraces, and uplands and in basins of glacial lakes. Most areas are irregular in shape and range from 3 to 75 acres in size.

Typically, the surface layer is very dark grayish brown sand about 2 inches thick. The subsoil is about 17 inches thick. It is brown, very friable sand in the upper part and dark yellowish brown, loose sand in the lower part. The substratum to a depth of about 60 inches is light yellowish brown and very pale brown, loose sand. Some small areas are eroded. Some areas have slopes of less than 6 percent or more than 12 percent. In places the surface layer is loamy sand. In some areas the content of quartz sand is more than 90 percent throughout, and in other areas the content of gravel and cobbles is as much as 35 percent.

Included with this soil in mapping are small areas of the excessively drained Plainbo soils. They are in positions on the landscape similar to those of the Plainfield soil. Plainbo soils have sandstone at a depth of 20 to 40 inches. Also included are small areas of

Plainfield sand that are severely eroded and small areas of moderately well drained soils that are otherwise similar to the Plainfield soil. Included soils make up 5 to 10 percent of the unit.

Permeability is rapid in the Plainfield soil. Available water capacity is low. Organic matter content is moderately low or low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used as native woodland and provide habitat for wildlife. Some areas are used for crops or pasture. Many areas that were cultivated have reverted to native woodland or have been planted to pine.

This soil is generally unsuitable for crop production. Crop yields are limited by the low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity, but irrigation water is difficult to apply uniformly. If cultivated crops are grown, water erosion is a moderate hazard. Soil blowing also is a hazard.

This soil is suited to legumes and grasses for improved pasture. Forage yields are limited by the low available water capacity. A cover of pasture plants is effective in controlling water erosion and soil blowing. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The main problem in managing forest is the sandy soil texture. Planting and harvesting with wheel-type tractors are somewhat limited because of the sandy soil texture. Planting vigorous nursery stock reduces the seedling mortality rate.

This soil readily absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity can result in the pollution of ground water.

This soil is only moderately suited to dwellings and to local roads and streets because of the slope. The buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas. Building the roads and streets on the contour or cutting and filling help to overcome the slope.

The land capability classification is IVe in irrigated areas and VIs in nonirrigated areas. The woodland ordination symbol is 8S.

PfD—Plainfield sand, 12 to 20 percent slopes. This deep, moderately steep, excessively drained soil is on convex side slopes in the uplands. Most areas are irregular in shape and range from 3 to 10 acres in size

Typically, the surface layer is very dark grayish brown sand about 4 inches thick. The subsoil is about 17 inches thick. It is dark yellowish brown and dark brown, very friable sand. The substratum to a depth of about 60 inches is yellowish brown, loose sand. Some small areas are eroded. Some areas have slopes of less than 12 percent or more than 20 percent. In place the surface layer is loamy sand. In some areas the content of quartz sand is more than 90 percent throughout, and in other areas the content of gravel an cobbles is as much as 35 percent.

Included with this soil in mapping are small areas of Plainfield sand that are severely eroded and small areas where the depth to sandstone is less than 60 inches. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is rapid in the Plainfield soil. Available water capacity is low. Organic matter content is moderately low or low in the surface layer.

Most areas are used as native woodland and provide habitat for wildlife. Some areas are planted to pine. Some are used for pasture.

This soil is unsuitable for crop production because of the low available water capacity, the hazard of water erosion, and the hazard of soil blowing.

This soil is suited to legumes and grasses for improved pasture. Forage yields are limited by the low available water capacity. A cover of pasture plants is effective in controlling water erosion and soil blowing. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the slope and the sandy soil texture. Planting on the contour and carefully locating skid roads during harvest help to control erosion and minimize equipment limitations. Planting and harvesting with wheel-type tractors are somewhat limited because of the sandy soil texture. Planting vigorous nursery stock reduces the seedling mortality rate.

This soil is poorly suited to septic tank absorption fields because of the slope. This limitation can be overcome by shaping the site to a suitable slope. The soil readily absorbs but does not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity can result in the pollution of ground water.

This soil is poorly suited to dwellings and to local roads and streets because of the slope. The buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas. Building the roads and streets on the contour or cutting and filling help to overcome the slope.

The land capability classification is VIIs in nonirrigated areas. The woodland ordination symbol is 8R.

Po—Poygan silt loam, 0 to 2 percent slopes. This deep, nearly level, poorly drained soil is on low flats and in drainageways and depressions on stream and lake terraces. It is subject to frequent flooding and ponding. Most areas are irregular in shape and range from 3 to 380 acres in size.

Typically, the surface layer is black silt loam about 8 inches thick. The subsoil is dark grayish brown and reddish brown, mottled, firm silty clay about 15 inches thick. The substratum to a depth of about 60 inches is reddish brown, mottled, very firm silty clay. In some small areas the slope is more than 2 percent. In some areas the surface layer is silty clay loam, loam, or sandy loam. In other areas it is an organic layer as much as 15 inches thick. In places the soil has a loamy mantle as much as 20 inches deep over clayey deposits.

Included with this soil in mapping are small areas of the somewhat poorly drained Korobago and Manawa soils. These soils are higher on the landscape than the Poygan soil. Korobago soils have a loamy mantle 20 to 40 inches deep over clayey deposits. Also included are small areas of poorly drained soils that also have a loamy mantle 20 to 40 inches deep over clayey deposits and small areas where the upper 16 to 51 inches is organic. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is slow in the Poygan soil. Available water capacity is moderate. In undrained areas a perched water table is above or near the surface much of the year. The depth of root penetration is limited by the water table. Organic matter content is high or very high in the surface layer. This layer is friable and can be easily tilled. It tends to crust, however, after heavy rains.

Most areas are drained and are used for crops. Undrained areas support native wetland vegetation and provide habitat for wildlife. Some are used as unimproved pasture or woodland.

Unless it is drained, this soil is generally unsuitable for cultivated crops. If drained and protected from flooding, however, it is suited to corn, soybeans, and small grain and to legumes and grasses for hay. Dikes and diversions can be used to prevent flooding. A surface drainage system can rapidly remove excess surface water. Open ditches and tile drains improve internal drainage. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. In drained areas crop yields are somewhat limited during dry years by the moderate available water capacity. Applications of lime and fertilizer are necessary. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is unsuitable for most forage species unless it is drained. Legumes and grasses can be grown for improved pasture in drained areas. Overgrazing depletes the plant cover and results in an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and reduces the rate of water infiltration. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the water table and competing vegetation. Wetness during the planting season generally limits reforestation to natural regeneration. Harvesting is frequently limited to periods when the soil is frozen. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is generally unsuitable as a site for septic tank absorption fields because of the flooding, the ponding, and the slow permeability and as a site for dwellings because of the shrink-swell potential, the flooding, and the ponding. Overcoming these limitations is difficult.

Because of the shrink-swell potential, low strength, and the ponding, this soil is poorly suited to local roads and streets. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome shrinking and swelling and low strength. Building the roads on raised fill material and installing large culverts help to prevent the damage caused by flooding and ponding.

The land capability classification is IIw, drained, in nonirrigated areas and VIw, undrained. The woodland ordination symbol is 4W.

Ps—Psammaquents, nearly level. These poorly

drained soils are on low flats and in drainageways and depressions. They are protected from natural flooding by an intricate system of dikes and drainage ditches but are flooded on a controlled basis to produce cranberries. Most areas are rectangular and range from 15 to 150 acres in size.

Typically, Psammaquents are sand or loamy sand. Individual layers vary widely in color and thickness. Generally, Psammaquents are the lower part of the subsoil or the substratum of sandy soils from which the upper 20 to 40 inches has been removed to form surrounding dikes. In some areas they are sandy deposits spread over organic soils.

Included with the Psammaquents in mapping are small areas of Dawson, Meehan, and Newson soils. The very poorly drained Dawson soils and the poorly drained and very poorly drained Newson soils are in positions on the landscape similar to those of the Psammaquents. The somewhat poorly drained Meehan soils are higher on the landscape than the Psammaquents. Dawson soils have an organic layer 16 to 51 inches thick. Newson and Meehan soils are sandy throughout. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is rapid in the Psammaquents. Available water capacity is low. The depth to the high water table is manipulated throughout the year.

Psammaquents are suited to cranberries but are not used for any other crop (fig. 15). Frost is a potential hazard during the entire growing season. An intensive water management system that includes controlled drainage and sprinkler irrigation is needed.

Psammaquents are unsuitable as sites for septic tank absorption fields, dwellings, or local roads and streets because of the wetness. If the surrounding dikes are removed, some areas are subject to flooding and ponding. Overcoming these limitations is difficult.

No land capability classification or woodland ordination symbol is assigned.

RbB—Reedsburg silt loam, 2 to 6 percent slopes. This deep, gently sloping, somewhat poorly drained soil is on the convex ridgetops of uplands underlain by dolomite bedrock. Most areas are irregular in shape and range from 3 to 70 acres in size.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The upper part of the subsoil is yellowish brown, mottled, friable silt loam. The next part is brown, mottled, very firm cherty silty clay. The lower part to a depth of 60 inches is strong brown, mottled, very firm cherty clay. Some areas are eroded. Some places have slopes of less than 2 percent or more than 6 percent. In some areas the surface layer is silty clay loam. Other areas have a silty mantle less than 15 inches thick.

Included with this soil in mapping are small areas of the well drained NewGlarus and Wildale soils. They are in positions on the landscape similar to those of the Reedsburg soil. NewGlarus soils have dolomite bedrock at a depth of 20 to 40 inches. Wildale soils have a silty mantle less than 15 inches thick. Also included are small areas of Reedsburg silt loam that are severely eroded and small areas of well drained soils. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderate in the silty upper part of the subsoil of the Reedsburg soil and slow in the clayey lower part. Available water capacity is moderate. In undrained areas a perched seasonal high water table is 1 to 3 feet below the surface during wet periods. The depth of root penetration is limited by the water table during the wet parts of the growing season. Organic matter content is moderate in the surface layer. This layer is friable and can be easily tilled. It tends to crust, however, after heavy rains.

Most areas are used for crops or pasture. Some areas are used as native woodland and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. In most areas artificial drainage is not required for dependable crop production. The perched water table is generally a problem for crops only early in the spring. Spring planting is delayed by the water table for 2 to 3 weeks. Any loss in growth caused by the later planting date generally is compensated for during the dry months of July and August, when the soil still has plentiful moisture reserves. In some wetter areas, such as drainageways and seepy areas, drainage is needed for dependable crop production. Surface drainage is used to remove excess surface water rapidly. Tile drains can be used for internal drainage. If the soil is cultivated, the hazard of water erosion is slight or moderate. Water erosion can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

If drained, this soil is suited to legumes and grasses for improved pasture. In undrained areas legume stands are difficult to maintain because of the perched water

Figure 15.—Harvesting cranberries in an area of Psammaquents, nearly level.

table and frost heaving. Overgrazing depletes the plant cover and thus results in water erosion and an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and increases the runoff rate and the hazard of erosion. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the rooting depth and competing vegetation. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be

controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields because of the perched water table and the slow permeability. Where the seasonal high water table is at a depth of more than 2 feet, these limitations can be overcome by constructing a mound of suitable filtering material. The soil is poorly suited to dwellings because of the perched water table. It is also poorly suited to dwellings with basements because of the shrink-swell potential. The wetness can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness. Shrinking and swelling can be overcome by adding coarse textured material, such as sand or gravel, under and around the basement or under the footings and concrete slab.

This soil is poorly suited to local roads and streets because of low strength and the potential for frost action. Covering or replacing the upper part of the soil with coarse textured fill material, such as sand or gravel, helps to overcome these limitations.

The land capability classification is IIe in nonirrigated areas. The woodland ordination symbol is 4D.

RoA—Roby sandy loam, 0 to 3 percent slopes. This deep, nearly level and gently sloping, somewhat poorly drained soil is on low flats, in drainageways and depressions, and on concave foot slopes on stream and lake terraces. Some areas of this soil are subject to rare flooding. Most areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is dark brown sandy loam about 9 inches thick. The subsoil is about 24 inches thick. It is dark yellowish brown, very friable sandy loam in the upper part and dark yellowish brown and brown, mottled, friable sandy loam in the lower part. The substratum to a depth of about 60 inches is stratified light brownish gray, mottled, loose sand and brown, mottled, friable sandy loam. Some areas have slopes of more than 3 percent. In places the surface layer is loam, loamy sand, or sand.

Included with this soil in mapping are small areas of the Friendship soils that have a loamy substratum and small areas of Billett and Lows soils. The well drained and moderately well drained Billett soils and the moderately well drained Friendship soils are higher on the landscape than the Roby soil. Billett soils are underlain by sandy deposits at a depth of 24 to 40 inches. Friendship soils have a sandy mantle from 40 to less than 60 inches deep over loamy deposits. The poorly drained Lows soils are lower on the landscape than the Roby soil. They have more clay in the subsoil than the Roby soil. They are underlain by sandy deposits at a depth of 20 to 40 inches. Also included are somewhat poorly drained areas where the soil is underlain by sandy deposits at a depth of 20 to 40 inches. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderate in the subsoil of the Roby soil and moderately rapid in the substratum. Available water capacity is moderate. In undrained areas the seasonal high water table is 1 to 3 feet below the surface during wet periods. The depth of root penetration is limited by the water table during the wet parts of the growing season. Organic matter content is moderately low in the surface layer. This layer is friable and can be easily tilled.

Most areas are drained and are used for crops or pasture. Undrained areas support native vegetation and provide habitat for wildlife. Some of these areas are used as unimproved pasture.

If drained, this soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. Crop yields during dry years, however, are limited by the moderate available water capacity. Areas that are subject to flooding can be protected by dikes or diversions. A surface drainage system can rapidly remove excess surface water. Open ditches and tile drains improve internal drainage. Loose sand enters the tile lines unless a suitable filter is used. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. If the soil is cultivated, soil blowing is a hazard. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by a winter cover crop. Wind stripcropping and field windbreaks help to prevent the damage to plants caused by windblown sand. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

If drained, this soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling soil blowing. During dry years forage yields are limited by the moderate available water capacity. Overgrazing depletes the plant cover and thus results in soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields because of the water table. Where the seasonal high water table is at a depth of more than 2 feet and the area is not subject to flooding, this problem can be overcome by constructing a mound of suitable filtering material. The soil is poorly suited to dwellings because of the water table and, in some areas, because of the flooding. The wetness can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness. The areas on flood plains should not be used as sites for dwellings.

This soil is poorly suited to local roads and streets because of the potential for frost action. This limitation can be overcome by covering or replacing the upper part of the soil with coarse textured fill material, such as sand or gravel.

The land capability classification is IIw in nonirrigated areas. The woodland ordination symbol is 4A.

RzB—Rozetta silt loam, 2 to 6 percent slopes. This deep, gently sloping, moderately well drained soil is on convex ridgetops and side slopes in the uplands. Most areas are irregular in shape and range from 3 to 120 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil is about 37 inches thick. It is dark yellowish brown, friable and firm silt loam in the upper part and dark yellowish brown, mottled, firm silt loam in the lower part. The substratum to a depth of about 60 inches is yellowish brown, mottled, friable silt loam. Some areas are eroded. Some small areas have slopes of less than 2 percent or more than 6 percent. Other areas have more sand and less silt and clay in the soil. In some places the surface layer is loam or sandy loam. In other places the silty mantle is 40 to 60 inches deep over clayey or sandy deposits.

Included with this soil in mapping are small areas of the well drained La Farge soils. These soils are in positions on the landscape similar to those of the Rozetta soil. They are underlain by sandstone at a depth of 20 to 40 inches. Also included are small severely eroded areas of Rozetta silt loam, areas where sandstone is at a depth of 40 to 60 inches, and areas where the surface layer is loamy sand. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderate in the Rozetta soil. Available water capacity is very high. A perched seasonal high water table is 4 to 6 feet below the surface during wet periods. Organic matter content is moderately low or moderate in the surface layer. This layer is friable and can be easily tilled. It tends to crust, however, after heavy rains.

Most areas are used for crops or pasture. Some areas support native vegetation and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. If the soil is cultivated, the hazard of water erosion is slight or moderate. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion. Overgrazing, however, depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and increases the runoff rate and the hazard of erosion. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is only moderately suited to septic tank absorption fields because of the perched water table. This limitation can be overcome by constructing a mound of suitable filtering material. The soil is only moderately suited to dwellings because of the shrink-swell potential. Also, the perched water table is a limitation on sites for dwellings with basements. This limitation can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by constructing the basement above the level of wetness. Shrinking and swelling can be overcome by adding coarse textured material, such as sand or gravel, under and around the basement or under the footings and concrete slab.

Because of low strength and the potential for frost action, this soil is poorly suited to local roads and streets. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome these limitations.

The land capability classification is IIe in nonirrigated areas. The woodland ordination symbol is 4A.

RzC2—Rozetta silt loam, 6 to 12 percent slopes, eroded. This deep, sloping, moderately well drained soil is on convex ridgetops and side slopes in the uplands. Most areas are irregular in shape and range from 3 to 50 acres in size.

In most cultivated areas, some of the original surface layer has been removed through erosion. Typically, the remaining surface layer is about 9 inches thick. It is dark brown silt loam that has been intermingled with some brown silt loam by plowing. The subsoil is about 41 inches thick. It is brown and yellowish brown, friable and firm si t loam in the upper part and yellowish brown, mottled, fr able silt loam in the lower part. The substratum to a depth of about 60 inches is yellowish brown, mottled, friable silt loam. In places the surface layer is loam or sandy loam. Some small areas are uneroded. Other small areas have slopes of less than 6 percent or more than 12 percent. In some places the silty mantle is 40 to 60 inches deep over clayey or sandy deposits. In other places the soil has more sand and less silt and clay.

Included with this soil in mapping are small areas of the well drained La Farge soils. These soils are in positions on the landscape similar to those of the Rozetta soil. They are underlain by sandstone at a depth of 20 to 40 inches. Also included are severely eroded areas of Rozetta silt loam, areas where stones and boulders are on the surface, small areas where sandstone is at a depth of 40 to 60 inches, and areas where the surface layer is loamy sand. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderate in the Rozetta soil. Available water capacity is very high. A perched seasonal h gh water table is 4 to 6 feet below the surface during wet periods. Organic matter content is moderately low or moderate in the surface layer. This layer tends to crust after heavy rains and in most cultivated areas readily forms clods if tilled when wet. This is a result of past mixing of firm silt loam subsoil material into the plow layer.

Most areas are used for crops or pasture. Some areas support native vegetation and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. If the soil is cultivated, further water erosion is a moderate hazard. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion. Overgrazing, however, depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and increases the runoff rate and the hazard of erosion. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is only moderately suited to septic tank absorption fields because of the perched water table and the slope. The wetness can be overcome by constructing a mound of suitable filtering material. The slope can be overcome by shaping the site to a suitable slope. The soil is only moderately suited to dwellings. The slope and the shrink-swell potential are the main limitations. The buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas. Shrinking and swelling can be overcome by adding coarse textured material, such as sand or gravel, under and around the basement or under the footings and concrete slab. Also, the perched water table is a limitation on sites for dwellings with basements. This limitation can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by constructing the basement above the level of wetness.

Because of low strength and the potential for frost action, this soil is poorly suited to local roads and streets. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome these limitations.

The land capability classification is IIIe in nonirrigated areas. The woodland ordination symbol is 4A.

RzD2—Rozetta silt loam, 12 to 20 percent slopes, eroded. This deep, moderately steep, moderately well drained soil is on convex ridgetops and side slopes in the uplands. Most areas are irregular in shape and range from 3 to 65 acres in size.

In most cultivated areas, some of the original surface layer has been removed through erosion. Typically, the

remaining surface layer is about 8 inches thick. It is dark grayish brown silt loam that has been intermingled with some dark yellowish brown silt loam by plowing. The subsoil is about 45 inches thick. It is dark yellowish brown, firm silt loam in the upper part and dark yellowish brown and yellowish brown, mottled, friable silt loam in the lower part. The substratum to a depth of about 60 inches is yellowish brown, mottled, friable silt loam. In places the surface layer is loam or sandy loam. Some small areas are uneroded. Other small areas have slopes of less than 12 percent or more than 20 percent. In some areas the silty mantle is 40 to 60 inches deep over clayey or sandy deposits. In other areas the soil has more sand and less silt and clay.

Included with this soil in mapping are small areas of the well drained La Farge soils. These soils are in positions on the landscape similar to those of the Rozetta soil. They are underlain by sandstone at a depth of 20 to 40 inches. Also included are small areas of severely eroded Rozetta silt loam, areas where stones and boulders are on the surface, small areas where sandstone is at a depth of 40 to 60 inches, and areas where the surface layer is loamy sand. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderate in the Rozetta soil. Available water capacity is very high. A perched seasonal high water table is 4 to 6 feet below the surface during wet periods. Organic matter content is moderately low or moderate in the surface layer. This layer tends to crust after heavy rains and in most cultivated areas readily forms clods if tilled when wet. This is a result of past intermingling of firm silt loam subsoil material into the plow layer.

Most areas are used for crops or pasture. Some areas support native vegetation and provide habitat for wildlife.

This soil is poorly suited to cultivated crops, but it is suited to legumes and grasses for hay. If the soil is cultivated, further water erosion is a severe hazard. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion. Overgrazing, however, depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Grazing when the surface layer is wet causes surface compaction and poor tilth and increases the runoff rate and the hazard of erosion. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. Problems in managing forest are the slope and competing vegetation. Planting on the contour and carefully locating skid roads during harvest help to control erosion and minimize equipment limitations. The seedling survival rate on the steeper slopes facing south and west can be increased by carefully planting vigorous nursery stock. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields and dwellings because of the slope. This limitation can be overcome on sites for septic tank absorption fields by shaping the site to a suitable slope. Buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas.

Because of low strength, the slope, and the potential for frost action, this soil is poorly suited to local roads and streets. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome low strength and frost action. Building the roads and streets on the contour or cutting and filling help to overcome the slope.

The land capability classification is IVe in nonirrigated areas. The woodland ordination symbol is 4R.

Ud—Udorthents, nearly level. This map unit consists of areas where soil and, in some cases, sandstone have been removed. Most of these areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the color, texture, and thickness of the soil material vary widely. Many areas are sandy, but some are loamy or clayey. The depth to sandstone ranges from a few inches to more than 60 inches. Some areas have slopes of more than 2 percent.

Udorthents are commonly in areas of Billett, Delton, Eleva, Friendship, Meehan, Newson, Partridge, Plainbo, Plainfield, and Wyeville soils and in areas of the Friendship soils that have a loamy substratum.

Permeability and available water capacity vary widely, depending on the texture of the remaining soil material.

Most areas are no longer used as a source of fill material and have reverted to weeds, brush, and trees. In most of these areas, the soil has been smoothed or

leveled and covered by a thin layer of topsoil. Some areas are used for crops or pasture.

Determining the suitability of an area of this unit for crops or pasture or as sites for septic tank absorption fields, dwellings, or local roads and streets requires onsite investigation.

No land capability classification or woodland ordination symbol is assigned.

UfB—Urne very fine sandy loam, 2 to 6 percent slopes. This moderately deep, gently sloping, somewhat excessively drained soil is on convex ridgetops and side slopes in the uplands. Most areas are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface layer is dark grayish brown very fine sandy loam about 8 inches thick. The subsoil is about 19 inches thick. It is brown and yellowish brown, friable very fine sandy loam and gravelly very fine sandy loam. Brownish yellow, partly consolidated sandstone that has many grains of grayish green glauconite is at a depth of about 27 inches. Some areas are eroded. Other areas have slopes of less than 2 percent or more than 6 percent. In some areas the surface layer is silt loam, loam, fine sandy loam, sandy loam, or loamy fine sand. In other areas the content of gravel is as much as 35 percent. In places the depth to sandstone is more than 40 inches.

Included with this soil in mapping are small areas of the well drained La Farge soils. These soils are in positions on the landscape similar to those of the Urne soil. They have more silt and clay and less sand than the Urne soil. Also included are small severely eroded areas of Urne very fine sandy loam, small areas where the subsoil is dominantly loam or clay loam, and areas where the depth to sandstone is less than 20 inches. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderately rapid in the Urne soil. Available water capacity is low. The depth of root penetration is limited by the underlying sandstone. Organic matter content is low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used for crops or pasture. Some areas support native vegetation and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During most years crop yields are limited by the low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. If the soil is cultivated, the hazard of water erosion is slight or moderate. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years forage yields are limited by the low available water capacity. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the rooting depth and competing vegetation. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is suited to dwellings. It is poorly suited to septic tank absorption fields. It is limited by the depth to bedrock. The sandstone does not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. This limitation can be overcome by constructing a mound of suitable filtering material.

This soil is only moderately suited to local roads and streets because of the potential for frost action. This limitation can be overcome by covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel.

The land capability classification is IIe in irrigated areas and IIIs in nonirrigated areas. The woodland ordination symbol is 4D.

UfC2—Urne very fine sandy loam, 6 to 12 percent slopes, eroded. This moderately deep, sloping, somewhat excessively drained soil is on convex ridgetops and side slopes in the uplands. Most areas are irregular in shape and range from 3 to 150 acres in size.

In most cultivated areas, some of the original surface layer has been removed through erosion. Typically, the remaining surface layer is about 8 inches thick. It is

dark brown very fine sandy loam that has been intermingled with some dark yellowish brown very fine sandy loam by plowing. The subsoil is about 20 inches thick. It is dark yellowish brown, very friable very fine sandy loam and gravelly very fine sandy loam. Brownish yellow, partly consolidated sandstone that has many layers and grains of grayish green glauconite is at a depth of about 28 inches. Some areas are uneroded. Other areas have slopes of less than 6 percent or more than 12 percent. In some areas the surface layer is silt loam, loam, fine sandy loam, sandy loam, or loamy fine sand In other areas the content of gravel is as much as 35 percent. In places the depth to sandstone is more than 40 inches.

Included with this soil in mapping are small areas of the well drained La Farge soils. These soils are in positions on the landscape similar to those of the Urne soil. They have more silt and clay and less sand than the Urne soil. Also included are small severely eroded areas of Urne very fine sandy loam, areas where stones and boulders are on the surface, small areas where the subsoil is dominantly loam or clay loam, and areas where the depth to sandstone is less than 20 inches. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderately rapid in the Urne soil. Available water capacity is low. The depth of root penetration is limited by the underlying sandstone. Organic matter content is low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used for crops or pasture. Some areas support native vegetation and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During most years crop yields are limited by the low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. The available water capacity and the depth of root penetration have been reduced by erosion in most cultivated areas. If the soil is cultivated, further water erosion is a moderate hazard. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years forage yields are limited by the low available water capacity. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the rooting depth and competing vegetation. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields. It is limited by the depth to bedrock. The sandstone does not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. This limitation can be overcome in some areas by constructing a mound of suitable filtering material. The soil is only moderately suited to dwellings because of the slope. The buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas, but the underlying bedrock can limit the depth of cuts.

This soil is only moderately suited to local roads and streets because of the slope and the potential for frost action. Building the roads and streets on the contour or cutting and filling help to overcome the slope, but the underlying bedrock can limit the depth of cuts.

The land capability classification is IIIe in irrigated and nonirrigated areas. The woodland ordination symbol is 4D.

UfD2—Urne very fine sandy loam, 12 to 20 percent slopes, eroded. This moderately deep, moderately steep, somewhat excessively drained soil is on convex ridgetops and side slopes in the uplands. Most areas are irregular in shape and range from 3 to 425 acres in size.

In most cultivated areas, some of the original surface layer has been removed through erosion. Typically, the remaining surface layer is about 8 inches thick. It is brown very fine sandy loam that has been intermingled with some dark yellowish brown very fine sandy loam by plowing. The subsoil is about 19 inches thick. It is dark yellowish brown and brown, friable very fine sandy loam. Yellowish brown, partly consolidated sandstone that has many grains of grayish green glauconite is at a depth of about 27 inches. Some areas are uneroded. Other areas have slopes of less than 12 percent or

more than 20 percent. In some areas the surface layer is silt loam, loam, fine sandy loam, sandy loam, or loamy fine sand. In other areas the content of gravel is as much as 35 percent. In places the depth to sandstone is more than 40 inches.

Included with this soil in mapping are small areas of the well drained La Farge soils. These soils are in positions on the landscape similar to those of the Urne soil. They have more silt and clay and less sand than the Urne soil. Also included are small severely eroded areas of Urne very fine sandy loam, areas where stones and boulders are on the surface, small areas where the subsoil is dominantly loam or clay loam, and areas where the depth to sandstone is less than 20 inches. Included soils make up 5 to 10 percent of individual mapped areas.

Permeability is moderately rapid in the Urne soil. Available water capacity is low. The depth of root penetration is limited by the underlying sandstone. Organic matter content is low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are used for crops and pasture. Some areas are used as native woodland and provide habitat for wildlife

This soil is poorly suited to cultivated crops, but it is suited to legumes and grasses for hay. During most years crop yields are limited by the low available water capacity. The available water capacity and the depth of root penetration have been reduced by erosion. If the soil is cultivated, further water erosion is a severe hazard. Soil blowing also is a hazard. Water erosion and soil blowing can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface. Soil loss can also be controlled by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion and soil blowing. During most years forage yields are limited by the low available water capacity. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the slope, the rooting depth, and competing vegetation. Planting on the contour and carefully locating skid roads during harvest help to control water erosion and minimize equipment limitations. The seedling survival rate on the steeper slopes facing south and west can be increased by carefully planting vigorous nursery stock. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields. It is limited by the depth to bedrock and the slope. The sandstone does not adequately filter the effluent. The poor filtering capacity can result in the pollution of ground water. These limitations can be overcome by constructing a mound of suitable filtering material and by shaping the site to a suitable slope. The underlying bedrock, however, can limit the depth of cuts.

This soil is poorly suited to dwellings and to local roads and streets because of the slope. The buildings should be designed so that they conform to the natural slope of the land. Land shaping is necessary in some areas. Building the roads and streets on the contour or cutting and filling help to overcome the slope. The underlying bedrock can limit the depth of cuts.

The land capability classification is IVe in nonirrigated areas. The woodland ordination symbol is 4R.

UfE—Urne very fine sandy loam, 20 to 30 percent slopes. This moderately deep, steep, somewhat excessively drained soil is on convex side slopes in the uplands. Most areas are long and narrow and range from 3 to 300 acres in size.

Typically, the surface layer is dark brown very fine sandy loam about 4 inches thick. The subsoil is about 24 inches thick. It is light olive brown, very friable very fine sandy loam in the upper part and dark yellowish brown, friable very fine sandy loam in the lower part. Yellowish brown, partly consolidated sandstone that has many grains of greenish gray glauconite is at a depth of about 28 inches. Some areas are eroded. Other areas have slopes of less than 20 percent or more than 30 percent. In some areas the surface layer is silt loam, loam, fine sandy loam, sandy loam, or loamy fine sand. In other areas the content of gravel is as much as 35 percent. In places the depth to sandstone is more than 40 inches.

Included with this soil in mapping are small areas of the excessively drained Boone soils. These soils are in positions on the landscape similar to those of the Urne

soil. Boone soils are sandy and are underlain by sandstone at a depth of 20 to 40 inches. Also included are severely eroded areas of Urne very fine sandy loam, areas where stones and boulders are on the surface, areas that have a 20- to 40-inch silty mantle, small areas of sandstone rock outcrop, areas where the subsoil is dominantly loam or clay loam, and areas where the depth to sandstone is less than 20 inches. Included areas make up 10 to 15 percent of individual mapped areas.

Permeability is moderately rapid in the Urne soil. Available water capacity is low. The depth of root penetration is limited by the underlying sandstone. Organic matter content is low in the surface layer.

Most areas are used for pasture. Some areas support native vegetation and provide habitat for wildlife. Some small areas are used for crops.

This soil is generally unsuitable for cultivated crops because of the steep slope. It is suited to legumes and grasses for improved pasture or hay in areas where the slope does not hinder the use of farm machinery. The steeper slopes generally can be used only for bluegrass pasture. In areas used for pasture or hay, water erosion and soil blowing are generally not a problem. During most years yields are limited by the low available water capacity. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the slope, the rooting depth, and competing vegetation. Planting on the contour and carefully locating skid roads during harvest help to control water erosion and minimize equipment limitations. The seedling survival rate on the steeper slopes facing south and west can be increased by carefully planting vigorous nursery stock. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is generally unsuited to septic tank absorption fields because of the depth to bedrock and the slope. It is generally unsuited to dwellings because of the slope. Overcoming these limitations is difficult.

This soil is poorly suited to local roads and streets because of the slope. Building the roads and streets on the contour or cutting and filling help to overcome the slope. The underlying bedrock can limit the depth of cuts.

The land capability classification is VIe in nonirrigated areas. The woodland ordination symbol is 4R.

UfF—Urne very fine sandy loam, 30 to 60 percent slopes. This moderately deep, very steep, somewhat excessively drained soil is on convex side slopes in the uplands. Most areas are long and narrow and range from 3 to 700 acres in size.

Typically, the surface layer is black very fine sandy loam about 2 inches thick. The subsoil is about 30 inches thick. It is brown, very friable very fine sandy loam in the upper part and light olive brown and light yellowish brown, friable very fine sandy loam and gravelly very fine sandy loam in the lower part. Brownish yellow and yellowish brown, partly consolidated sandstone that has many layers and grains of greenish gray glauconite is at a depth of about 33 inches. Some areas are eroded. Other areas have slopes of less than 30 percent. In some areas the surface layer is silt loam, loam, fine sandy loam, sandy loam, or loamy fine sand. In other areas the content of gravel is as much as 35 percent. In places the depth to sandstone is more than 40 inches.

Included with this soil in mapping are small areas of the excessively drained Boone soils. They are in positions on the landscape similar to those of the Urne soil. Boone soils are sandy and are underlain by sandstone at a depth of 20 to 40 inches. Also included are severely eroded areas of Urne very fine sandy loam, areas where stones and boulders are on the surface, areas that have a 20- to 40-inch silty mantle, small areas of sandstone rock outcrop, small areas where the subsoil is dominantly loam or clay loam, and areas where the depth to sandstone is less than 20 inches. Included areas make up 10 to 15 percent of individual mapped areas.

Permeability is moderately rapid in the Urne soil. Available water capacity is low. The depth of root penetration is limited by the underlying sandstone.

Most areas are used as native woodland and provide habitat for wildlife. Some of these areas are used as unimproved pasture.

This soil is unsuitable for cultivated crops because of the very steep slope. It is suited to pasture, but it generally can be used only for bluegrass pasture. Overgrazing depletes the plant cover and thus results in water erosion and soil blowing and an increase in the extent of undesirable plant species. Proper stocking

rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the slope, the rooting depth, and competing vegetation. Planting on the contour and carefully locating skid roads during harvest help to control water erosion and minimize equipment limitations. The seedling survival rate on the steeper slopes facing south and west can be increased by carefully planting vigorous nursery stock. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. The plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is generally unsuited to septic tank absorption fields because of the depth to bedrock and the slope. It is generally unsuited to dwellings because of the slope. Overcoming these limitations is difficult.

This soil is poorly suited to local roads and streets because of the slope. Building the roads and streets on the contour or cutting and filling help to overcome the slope. The underlying bedrock can limit the depth of cuts.

The land capability classification is VIIe in nonirrigated areas. The woodland ordination symbol is 4R.

Wa—Wautoma loamy sand, 0 to 2 percent slopes. This deep, nearly level, poorly drained and very poorly drained soil is on low flats and in drainageways and depressions on stream and lake terraces. It is subject to ponding. Most areas are irregular in shape and range from 3 to 500 acres in size.

Typically, the surface layer is black loamy sand about 8 inches thick. The subsoil is about 30 inches thick. It is gray, mottled, loose sand in the upper part; gray, mottled, friable loam in the next part; and light gray, mottled, firm silty clay in the lower part. The substratum to a depth of about 60 inches is yellowish red, mottled, firm silty clay. Some small areas have slopes of more than 2 percent. In some areas the surface layer is mucky loamy sand or mucky sand. In other areas it is an organic layer as much as 15 inches thick.

Included with this soil in mapping are small areas of Dawson, Newson, Poygan, and Wyeville soils. The very poorly drained Dawson soils, the very poorly drained and poorly drained Newson soils, and the poorly drained Poygan soils are in positions on the landscape similar to those of the Wautoma soil. Dawson soils are organic to a depth of 16 to 51 inches and are underlain by sandy deposits. Newson soils are sandy throughout. Poygan soils formed dominantly in clayey deposits. The somewhat poorly drained Wyeville soils are higher on the landscape than the Wautoma soil. Also included are small, poorly drained areas where a sandy mantle is 40 to 60 inches deep over clayey deposits and areas where the lower part of the subsoil and the substratum are loamy. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderately rapid or rapid in the sandy upper part of the Wautoma soil and slow or very slow in the clayey lower part. Available water capacity is low. In undrained areas the water table is above or near the surface much of the year. The depth of root penetration is limited by the water table. Organic matter content is high in the surface layer. This layer is very friable and can be easily tilled.

Most areas are drained and used for crops or pasture. Undrained areas support native wetland vegetation and provide habitat for wildlife. Some of the areas are used as unimproved pasture. Some are used as native woodland.

Unless it is drained, this soil is generally unsuitable for cultivated crops. If drained, it is suited to corn, soybeans, and small grain and to legumes and grasses for hay. A surface drainage system can rapidly remove excess surface water. Open ditches and tile drains improve internal drainage. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. If tile is installed in the sandy part of the soil, loose sand enters the tile lines unless a suitable filter is used. In drained areas crop yields in most years are limited by the low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility.

Unless it is drained, this soil is unsuitable for most forage species. Legumes and grasses can be grown for improved pasture in drained areas. During most years forage yields are limited by the low available water capacity. A cover of pasture plants is effective in controlling soil blowing. Overgrazing depletes the plant cover and thus results in soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the water table, the rooting depth, and competing vegetation. Wetness during the planting season generally limits reforestation to natural regeneration. Harvesting is frequently limited to periods when the soil is frozen. Harvesting by clear-cutting or

area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical preparation.

This soil is generally unsuited to septic tank absorption fields, mainly because of the ponding and the slow or very slow permeability. The soil is generally unsuited to dwellings because of the ponding. Overcoming these limitations is difficult.

This soil is poorly suited to local roads and streets because of the ponding. Building the roads on raised fill material and installing culverts help to prevent the damage caused by ponding.

The land capability classification is IIIw, drained, in irrigated and nonirrigated areas and VIw, undrained. The woodland ordination symbol is 3W.

WdB—Wildale cherty silt loam, 2 to 6 percent slopes. This deep, gently sloping, well drained soil is on the convex ridgetops of uplands underlain by dolomite bedrock. Most areas are long and narrow and range from 3 to 400 acres in size.

Typically, the surface layer is dark brown cherty silt loam about 9 inches thick. The upper part of the subsoil is dark red, very firm cherty clay. The next part is brown and dark red, very firm clay. The lower part to a depth of about 60 inches is red, very firm clay. Some areas are eroded. Other areas have slopes of less than 2 percent or more than 6 percent. In some places the depth to bedrock is 40 to 60 inches. In other places the silty mantle is more than 15 inches thick.

Included with this soil in mapping are small areas of the well drained NewGlarus soils and the somewhat poorly drained Reedsburg soils. NewGlarus and Reedsburg soils are in positions on the landscape similar to those of the Wildale soil. NewGlarus soils are underlain by dolomite bedrock at a depth of 20 to 40 inches. Also included are small severely eroded areas of Wildale cherty silt loam and areas where stones are on the surface. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is slow in the Wildale soil. Available water capacity is moderate. Organic matter content is moderate in the surface layer. This layer is friable and can be easily tilled. It tends to crust, however, after heavy rains.

Most areas are used for crops or pasture. Some areas support native vegetation and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During dry years crop yields are somewhat limited by the moderate available water capacity. If the soil is cultivated, the hazard of water erosion is slight or moderate. Water erosion can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion. During most years forage yields are somewhat limited by the moderate available water capacity. Overgrazing depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the clayey soil, the rooting depth, and competing vegetation. Planting and harvesting with wheel-type tractors are somewhat limited by the clayey subsoil. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields because of the slow permeability. This limitation can be overcome by constructing a mound of suitable filtering material. The soil is poorly suited to dwellings because of the shrink-swell potential. Shrinking and swelling can be overcome by adding coarse textured material, such as sand or gravel, under and around the basement or under the footings and concrete slab.

This soil is poorly suited to local roads and streets because of low strength and the shrink-swell potential. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome these limitations.

The land capability classification is IIe in nonirrigated areas. The woodland ordination symbol is 3D.

WdC2—Wildale cherty silt loam, 6 to 12 percent slopes, eroded. This deep, sloping, well drained soil is on the convex ridgetops of uplands underlain by dolomite bedrock. Most areas are long and narrow and range from 3 to 70 acres in size.

In most cultivated areas, some of the original surface layer has been removed through erosion. Typically, the

remaining surface layer is about 6 inches thick. It is dark brown cherty silt loam that has been intermingled with some brown cherty silty clay loam by plowing. The upper part of the subsoil is brown, firm cherty silty clay loam. The lower part to a depth of about 60 inches is dark red and dark yellowish brown, very firm clay. Some areas are uneroded. Other areas have slopes of less than 6 percent or more than 12 percent. In some places the depth to bedrock is 40 to 60 inches. In other places the silty mantle is more than 15 inches thick.

Included with this soil in mapping are small areas of the well drained NewGlarus soils. These soils are in positions on the landscape similar to those of the Wildale soil. NewGlarus soils are underlain by dolomite bedrock at a depth of 20 to 40 inches. Also included are small severely eroded areas of Wildale cherty silt loam, areas where stones are on the surface, and somewhat poorly drained soils in seepy areas. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is slow in the Wildale soil. Available water capacity is moderate. Organic matter content is moderate in the surface layer. This layer tends to crust after heavy rains and in most cultivated areas readily forms clods if tilled when wet. This is a result of past mixing of firm silty clay loam subsoil material into the plow layer.

Most areas are used for crops or pasture. Some areas support native vegetation and provide habitat for wildlife.

This soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. During dry years crop yields are somewhat limited by the moderate available water capacity. If the soil is cultivated, further water erosion is a moderate hazard. Water erosion can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by contour stripcropping, a conservation cropping system, diversions, and grassed waterways. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility and good tilth and increase the rate of water infiltration.

This soil is suited to legumes and grasses for improved pasture. A cover of pasture plants is effective in controlling water erosion. During most years forage yields are somewhat limited by the moderate available water capacity. Overgrazing depletes the plant cover and thus results in erosion and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the clayey soil texture, the rooting depth, and competing vegetation. Planting and harvesting with wheel-type tractors are somewhat limited by the clayey subsoil. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields because of the slow permeability. This limitation can be overcome by constructing a mound of suitable filtering material. The soil is poorly suited to dwellings because of the shrink-swell potential. Shrinking and swelling can be overcome by adding coarse textured material, such as sand or gravel, under and around the basement or under the footings and concrete slab.

This soil is poorly suited to local roads and streets because of low strength and the shrink-swell potential. Covering or replacing the upper part of the soil with coarse textured base material, such as sand or gravel, helps to overcome these limitations.

The land capability classification is IIIe in nonirrigated areas. The woodland ordination symbol is 3D.

WeA—Wyeville sand, 0 to 3 percent slopes. This deep, nearly level and gently sloping, somewhat poorly drained soil is on low flats, in drainageways and depressions, and on concave foot slopes on stream and lake terraces. Most areas are irregular in shape and range from 3 to 1,000 acres in size.

Typically, the surface layer is very dark gray sand about 8 inches thick. The subsoil is about 40 inches thick. It is brown, grayish brown, and light brown, mottled, very friable sand in the upper part and reddish brown, mottled, firm silty clay in the lower part. The substratum to a depth of about 60 inches is intermingled reddish brown and light reddish brown, mottled, firm silty clay. Some areas have slopes of more than 3 percent. In places the surface layer is loamy sand, loamy fine sand, or fine sand. In some areas the sandy mantle is 40 to 60 inches deep over clayey deposits, and in other areas it is only 10 to 20 inches deep over clayey deposits.

Included with this soil in mapping are small areas of Delton, Korobago, Meehan, and Wautoma soils. The moderately well drained Delton soils are higher on the landscape than the Wyeville soil. The somewhat poorly drained Korobago and Meehan soils are in positions on the landscape similar to those of the Wyeville soil. Korobago soils have a loamy mantle 20 to 40 inches deep over the clayey deposits. Meehan soils are sandy throughout. The poorly drained and very poorly drained

Wautoma soils are lower on the landscape than the Wyeville soil. Also included are areas where the lower part of the subsoil and the substratum are loamy. Included soils make up 10 to 15 percent of individual mapped areas.

Permeability is moderately rapid in the sandy upper part of the Wyeville soil and slow or very slow in the clayey lower part. Available water capacity is low. In undrained areas the seasonal high water table is 1 to 3 feet below the surface during wet periods. The depth of root penetration is limited by the water table during the wet parts of the growing season. Organic matter content is low or very low in the surface layer. This layer is very friable and can be easily tilled.

Most areas are drained and are used for crops or pasture. Some areas are undrained and support native vegetation. These areas provide habitat for wildlife.

If drained, this soil is suited to corn, soybeans, and small grain and to legumes and grasses for hay. In drained areas crop yields in most years are limited by the low available water capacity. The soil is suited to sprinkler irrigation, which can improve productivity. Open ditches and tile drains are used to improve internal drainage. If tile is installed in the sandy part of the soil, loose sand enters the tile lines unless a suitable filter is used. Unless they are protected by a plant cover, ditchbanks are easily eroded by flowing water. Vertical banks cave in and plug the ditch. Soil blowing is a hazard in cultivated areas. It can be controlled by a conservation tillage system, such as no-till planting, that leaves crop residue on the surface and by a winter cover crop. Wind stripcropping and field windbreaks help to prevent the damage to plants caused by windblown sand. Applications of lime and fertilizer are needed. Regular additions of manure help to maintain fertility.

If drained, this soil is suited to legumes and grasses for improved pasture. During most years forage yields are limited by the low available water capacity. A cover of pasture plants is effective in controlling soil blowing. Overgrazing depletes the plant cover and results in soil blowing and an increase in the extent of undesirable plant species. Applications of lime and fertilizer, pasture renovation, proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This soil is suited to trees. The problems in managing forest are the sandy soil texture, the rooting depth, and competing vegetation. Planting and harvesting with wheel-type tractors are somewhat limited by the sandy surface layer and subsoil. Planting vigorous nursery stock reduces the seedling mortality rate. Harvesting by clear-cutting or area-selection methods helps to prevent windthrow of the remaining trees. Plant competition following harvest can be controlled by herbicides or by mechanical site preparation.

This soil is poorly suited to septic tank absorption fields because of the water table and the slow or very slow permeability. Where the seasonal high water table is at a depth of more than 2 feet, these limitations can be overcome by constructing a mound of suitable filtering material. The soil is poorly suited to dwellings because of the water table. The wetness can be overcome by installing a subsurface drainage system that includes a gravity outlet or another dependable outlet or by adding fill material, which can raise the site above the level of wetness.

This soil is poorly suited to local roads and streets because of low strength. Covering or replacing the clayey part of the soil with coarse textured base material, such as sand or gravel, helps to overcome this limitation.

The land capability classification is IIIw in irrigated and nonirrigated areas. The woodland ordination symbol is 3S.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban and built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditures of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The

Figure 16.—Urban expansion in an area of somewhat poorly drained Curran silt loam, 0 to 3 percent slopes. Where drained, this soil is considered prime farmland.

temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

Juneau County has 72,180 acres of prime farmland. About 90 percent of this land is farmed. The prime farmland is scattered throughout the southern half of the county. Most, however, is in associations 4, 5, 7, and 8, which are described under the heading "General Soil Map Units." The crops grown on this land are mainly corn, oats, and alfalfa.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses (fig. 16). The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Soils that have limitations, such as a seasonal high water table, frequent flooding during the growing season, or inadequate rainfall, qualify for prime farmland only in areas where these limitations have been overcome by such measures as drainage, flood control, or irrigation. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

In 1985, about 115,000 acres in Juneau County was used for cropland and about 34,000 acres for permanent pasture. Of the total cropland, about 47,000 acres was used for corn, primarily field corn; about 7,000 acres for soybeans; about 12,000 acres for small grain, mainly oats; and about 29,000 acres for rotational hay, mainly alfalfa. Another 8,000 acres was used for vegetable and truck crops and 3,000 acres for specialty crops, such as cranberries, mint, orchard crops, and Christmas trees (fig. 17). The remaining cropland acreage consists of about 3,000 acres of fallow land, about 4,000 acres of temporary conservation diversion, and about 2,000 acres of idle cropland.

Much of the alfalfa, oats, and corn is fed to the dairy herds. Corn and soybeans are commonly grown as cash grain crops. Alfalfa and bromegrass are grown for hay on the well drained soils. On the wetter soils, red clover and timothy are common substitutes. Forage species for improved pasture are the same as for hay. Forage species are green-chopped and hauled to feeding areas. Permanent pasture is mostly bluegrass. Where renovation is possible, birdsfoot trefoil is grown.

The soils in Juneau County vary in their suitability for specialty crops. Special management is needed for such crops. Management for potato production, for example, includes the basic management techniques used for the commonly grown crops, plus irrigation and extensive applications of herbicide, fungicide, and insecticide. Some of the specialty crops grown in Juneau County are apples, cranberries, melons, mint,

Figure 17.—Christmas trees on the Meehan soil in an area of Meehan-Newson complex, 0 to 3 percent slopes.

raspberries, strawberries, tomatoes, and many vegetables. The commonly grown vegetables are sweet corn, snap beans, peas, and potatoes.

The latest information about growing specialty crops can be obtained from the local office of the Cooperative Extension Service.

The soils in Juneau County have good potential for increased production of farm crops. If proper conservation measures are applied, many thousands of acres of woodland, including some prime farmland, could be converted to cropland. Most of these areas need proper drainage, irrigation, or both. In addition to

the reserve productive capacity represented by this land, food production could also be increased by extending the latest crop production technology to all other existing cropland in the county. This soil survey can greatly facilitate the application of such technology.

Management varies on the different kinds of soil in Juneau County. Basic management, however, is needed on practically all of the soils. Basic management of cropland includes controlling water erosion, providing an adequate drainage system, maintaining fertility, maintaining or improving tilth, liming, preparing a good seedbed, and timely harvesting. Basic management of pasture includes pasture renovation, proper stocking rates, and clipping or mowing where feasible. Clipping and mowing remove weeds and brush and encourage uniform regrowth and grazing. Timely deferment of grazing is also needed to keep the pasture in good condition.

Water erosion is generally a hazard if the slope is more than 2 percent. About 50 percent of the acreage in Juneau County is susceptible to erosion, but most of this acreage has a protective cover of vegetation. Erosion is potentially a serious problem, however, where the erodible soils are used for row crops.

Erosion is damaging for three reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a layer in or below the subsoil that limits the depth of the root zone. Such a layer includes the clayey subsoil in Wildale soils and the bedrock in La Farge soils. Plainfield and other sandy soils are damaged because the infertile sand that has little or no organic matter is exposed. Second, erosion adversely affects tilth and the infiltration of water. Eroded soils are generally more difficult to till than uneroded soils because the clay content of the plow layer generally increases when part of the subsoil is incorporated into the plow layer. Third, erosion results in sediment entering lakes and streams. Control of erosion helps to prevent this sedimentation and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

Erosion control practices should provide a protective cover, reduce runoff, and increase infiltration. A conservation cropping system that keeps the vegetative cover on the soil for extended periods can hold soil erosion to amounts that do not reduce the productive capacity of the soils. On dairy farms, which require pasture and hay, the legume or legume and grass forage crops in the cropping system reduce erosion and also provide nitrogen and improve tilth for other crops grown in rotation.

A conservation tillage system, such as no-till planting, that leaves crop residue on the surface helps to increase infiltration and reduce the hazards of runoff and water erosion. No-till planting can be adapted to most soils in the county. It is more difficult to use successfully on poorly drained and very poorly drained soils.

Contour stripcropping and contour farming also reduce runoff and erosion. Grassed waterways remove excess surface water and reduce the risk of erosion along natural drainageways (fig. 18). Diversions direct runoff away from erodible areas. Although they are not common in the county, terraces reduce the length of slope and provide safe outlets for runoff.

Critical area plantings, such as along roadsides and in gravel pits, help to stabilize highly erodible soils where vegetation is difficult to establish.

Soil blowing is a hazard on the sandy Boone, Delton, Friendship, Meehan, Newson, Partridge, Plainbo, Plainfield, Wautoma, and Wyeville soils and on the organic Dawson, Loxley, and Palms soils. It is also a hazard on the Algansee, Billett, Eleva, Elkmound, Glendora, Korobago, Roby, and Urne soils. Soil blowing can damage these soils in a short time if winds are strong and the soils are dry and bare of vegetation or crop residue. Maintaining vegetative cover or crop residue on the surface, stripcropping, and planting field windbreaks help to control soil blowing on these soils.

Information about the design of practices that control erosion and soil blowing on each kind of soil can be obtained at the local office of the Soil Conservation Service.

Soil drainage is a major management concern on about 40 percent of the acreage used for crops and pasture in the survey area. Some soils are naturally so wet that the production of crops common to the area is generally not possible unless the soils are drained. These are the poorly drained and very poorly drained soils, such as Ettrick, Lows, Newson, Poygan, and Wautoma. Also in this category are the organic soils, such as Dawson, Loxley, and Palms. If organic soils are used for cropland, controlled drainage is necessary to minimize oxidation and subsidence.

Unless they are artificially drained, the somewhat poorly drained soils are so wet that crops are damaged during most years. In this category are the Curran, Hixton Variant, Korobago, Manawa, Meehan, Orion, Partridge, Reedsburg, Roby, and Wyeville soils.

The design of both surface and subsurface drainage

Figure 18.—Grassed waterways in an area of La Farge silt loam, 12 to 20 percent slopes, eroded.

systems varies with the kind of soil and site conditions. A combination of surface drainage and subsurface drainage is needed in most areas of the poorly drained and very poorly drained soils used for intensive rowcropping. Diversions are needed in some areas to divert runoff from adjacent slopes.

Crops grown in most areas of poorly drained and very poorly drained soils are subject to frost damage because of the low position of these soils on the landscape. The number of frost-free growing days per season is lower than on adjacent uplands because of cold air drainage to the lowlands.

Information on drainage design for each kind of soil can be obtained at the local office of the Soil Conservation Service.

Soil fertility is quite variable in the soils of Juneau County, depending on the past cropping history. Nearly all of the soils in the county have been weathered long enough to cause them to be naturally acid. Applications of lime are needed to raise the pH level sufficiently for

alfalfa and other crops that grow best on nearly neutral soils. In general, coarse and moderately coarse textured soils require less lime than medium textured soils. Available potash levels are naturally low in many soils of the survey area. On all soils additions of lime and fertilizer should be based on the results of soil tests, on the needs of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime needed.

Soil tilth is an important factor in the germination and emergence of seeds and in the infiltration of water into the soil. Soils that have good tilth are granular and porous. Tilling or grazing when the soil is too wet can cause poor tilth, especially on soils with a loam or silt loam surface layer. Intense rainfall on bare soil can cause a crust to form on the surface, which reduces infiltration and increases runoff and erosion. Good soil tilth is more difficult to maintain on eroded soils because they have a lower content of organic matter. Returning crop residue to the soil and regularly adding manure or other organic material help to improve soil structure and tilth.

Excessive tillage, use of heavy farm machinery, overgrazing, and tilling or grazing when the soil is too wet can result in surface compaction and thus in poor tilth. Excessive tillage can be avoided by using a system of conservation tillage. Proper stocking rates and rotation grazing can prevent overgrazing. Chisel plowing helps to loosen compacted soil.

Irrigation on some soils helps to maintain a sufficient amount of available water for specialty crops, such as sweet corn, snap beans, peas, and potatoes. In Juneau County, about 10,000 acres was irrigated in 1987. Most of the acreage was Friendship and Plainfield soils. In the future, the extent of irrigation could be increased considerably on large acreages of nearly level, suitable soils. Because of the rapid permeability in some of these soils, however, the irrigation rate should be limited. Limiting the irrigation rate prevents the leaching of plant nutrients and other chemicals out of the root zone and eventually into the ground water. The water for irrigation is mostly drawn from wells, and drawdown of the water table should be a concern.

Information about the design of irrigation systems for each kind of soil is available in the local office of the Soil Conservation Service.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in tables 6 and 7. In any given year, yields may be higher or lower than those indicated in the tables because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the tables.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in tables 6 and 7 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops *(8)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely

major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in tables 6 and 7.

Woodland Management and Productivity

Thomas J Quilty, forester, Wisconsin Department of Natural Resources, helped prepare this section.

Forest once covered almost all of the land area that is now Juneau County. Many areas were subsequently cleared for cropland throughout the county. Today, intensive farming dominates in the southern half of the county where the better agricultural soils are located.

About 51 percent of the land area in the county, or about 252,000 acres, is in commercial forest. Of that, about 41 percent is oak or oak in combination with other species, about 33 percent consists of other hardwoods, and about 26 percent consists of conifers *(4)*.

About 68 percent of the commercial forest land is owned by farmers and other private owners. Almost 30 percent is in public ownership. The remainder is owned by forest industries.

The paragraphs that follow specify the forest types by the associations described under the heading "General Soil Map Units."

The most extensive forest type is in the Friendship-Plainfield and Plainbo-Partridge associations and on the better drained soils of the Newson-Meehan-Dawson association. Northern pin oak and pine forest dominate in these areas. Jack pine is by far the dominant pine species, but red pine is also commercially important. There is some white pine. The northern pin oak is mostly of poor saw log quality but is in demand for pulp and for firewood (fig. 19).

In the Urne-La Farge-Rozetta and Wildale-NewGlarus-Reedsburg associations, northern red oak is by far the most important species. White oak, aspen, basswood, hard and soft maple, and hickory are also important.

The forest in the Algansee-Glendora association is dominated by soft maple. River birch, white oak, northern red oak, cottonwood, and white pine are also common.

The Poygan-Wyeville-Wautoma and Ettrick-Curran-Jackson associations are intensively farmed. The relatively small forest remaining is similar to that in the Algansee-Glendora association.

The grazing of woodland by domestic livestock is a continuing problem. The acreage of grazed woodland is decreasing, however, mainly because of better management of livestock and forage. Some farmers,

Figure 19.—Jack pine and northern pin oak logs in a clearcut area of Friendship sand, 1 to 6 percent slopes. These logs will be used for pulp.

recognizing the value of their forests, are keeping livestock out.

Forests could be considerably improved by removing defective trees and eliminating undesirable species. Forest fires have been largely suppressed but are still occasionally a problem, especially in the northern pin oak and pine forests. Insect infestations have not been very important. Diseases, such as oak wilt, have caused problems on a local basis.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic feet per acre per year, which the

indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; *F*, a high content of rock fragments in the soil; and *L*, low strength. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, F, and L.

In table 8, *slight*, *moderate*, and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, fire lanes, and log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment or season of use is not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. Seedling mortality ratings in Juneau County were based on south aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It is the dominant species on the soil and the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production. Further information about these trees is available in the local office of the Soil Conservation Service.

Additional information about woodland management and productivity can be obtained from the Wisconsin Department of Natural Resources forester, the local office of the Soil Conservation Service, or the Cooperative Extension Service.

Windbreaks and Environmental Plantings

The majority of windbreaks in Juneau County are used to protect farmsteads and rural homes. The commonly planted tree species are white spruce, Norway spruce, red pine, and eastern white pine. Generally, they are planted on the north or west sides of the protected areas or on both sides.

In the northeastern part of the county, the irrigation of sandy soils is becoming increasingly important. Soil blowing is a hazard. Tree windbreaks are not practical because they interfere with center-pivot irrigation systems. They also interfere with aerial applications of pesticides and fertilizers. Under these conditions, wind barriers of grasses or low-growing shrubs have proven to be a logical alternative to trees. Switchgrass is commonly used for wind barriers. Silky dogwood and cotoneaster are commonly used shrubs because they are resistant to chemicals applied to crops.

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 9 shows the height that locally grown trees and shrubs are predicted to reach in 20 years on various soils. The estimates in table 9 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service, the Wisconsin Department of Natural Resources forester, the Cooperative Extension Service, or from a commercial nursery.

Recreation

The soils of the survey area are rated in table 10 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 10, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 10 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 13 and interpretations for dwellings without basements and for local roads and streets in table 12.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils are gently sloping and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet,

are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Thomas P. Thrall, biologist, Soil Conservation Service, helped prepare this section.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

The eight soil associations under the heading "General Soil Map Units" are described in terms of wildlife habitat. In some cases, associations which provide similar habitat have been described together.

The native vegetation on the Friendship-Plainfield association and the Plainbo-Partridge association consists primarily of jack pine and northern pin oak (Hill's oak). Some areas have been planted to red pine. A major land conversion is taking place in the northern part of the Friendship-Plainfield association, where large areas are being cleared for irrigated vegetable production. Because the diversity of the vegetation is not as great, this association does not have the variety or the abundance of wildlife species that is in some of the other associations. White-tailed deer, gray fox, skunk, gray squirrel, fox squirrel, and coyote are common species. Some unique species, such as the slender glass lizard (on the Wisconsin threatened species list), are in these associations. The most productive wildlife areas are in areas where these two associations join other associations, particularly those containing wetlands.

The wet sandy and mucky soils in the Newson-Meehan-Dawson association dominate the northern half of the county. Much of this land is in public ownership as part of the Necedah National Wildlife Refuge or the Meadow Valley State Wildlife Area. The refuge has developed several large pools which attract migrating waterfowl to the area. This association is not a major waterfowl-producing area, however, because the acid water does not provide a great deal of food for waterfowl. Also, there is a lack of grassy upland nesting sites. Beaver are abundant in this area. The upland vegetation consists of jack pine, aspen, and northern pin oak (Hill's oak). White-tailed deer, woodcock, ruffed grouse, coyote, and gray fox are common upland species. Wild turkeys were reintroduced here in the early 1950's, and the local flock still persists (fig. 20).

Vegetation in the Algansee-Glendora association consists of river birch, red maple, swamp white oak, cottonwood, ash, and elm. This association provides important habitat for many bird species, including the tree-nesting wood duck and the threatened red-shouldered hawk. Bald eagles and ospreys can be seen perched in the trees along the Wisconsin River in the winter. Mink, muskrat, otter, beaver, and raccoon are abundant. The brushier areas provide good habitat for ruffed grouse and white-tailed deer. This association provides nesting trees for birds using adjacent habitat in other associations.

The Poygan-Wyeville-Wautoma and Ettrick-Curran-Jackson associations have a mix of cropland, wetlands, and oak woodland. As a result, they provide good habitat for many species of wildlife, such as white-tailed deer, bobwhite quail, cottontail rabbits, raccoon, skunks, badgers, red fox, gray fox, beaver, and other furbearers. Sandhill cranes, Canada geese, and wild turkeys can frequently be seen in open fields.

Most areas of the Urne-La Farge-Rozetta and Wildale-NewGlarus-Reedsburg associations are cropland. Areas that are too steep or rocky to crop are used for either pasture or woodland. Northern red oak is the major tree species. Because of the interspersion of oak woodland and cropland, these associations provide

Figure 20.—Wild turkeys in an area of the Newson-Meehan-Dawson association.

excellent habitat for white-tailed deer, ruffed grouse, wild turkey, fox squirrel, raccoon, skunk, coyote, and cottontail rabbit. Some bobwhite quail also inhabit these areas. Excessive grazing of woodland limits the abundance of wildlife species that rely on small trees and shrubs. Wild turkeys have recently been released here and are thriving.

In table 11, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or

kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are

given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 12 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping

and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 13 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 13 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 13 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is

disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 13 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 14 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 14, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil),

the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 15 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones, boulders, or organic matter. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a

cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity in the root zone. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone and by soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce water erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 19.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 16 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay

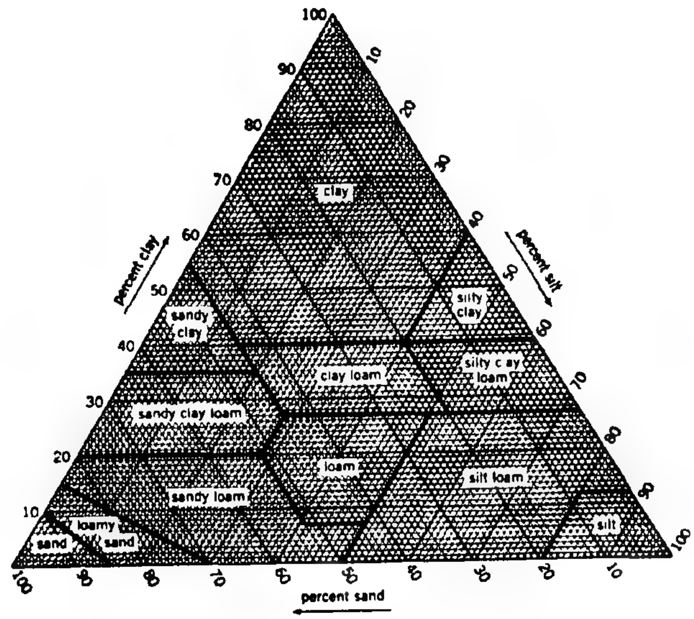

Figure 21.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

in the fraction of the soil that is less than 2 millimeters in diameter (fig. 21). "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic

matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 19.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 17 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of

organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 17, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the

soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 18 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 18, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 18 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs, on the average, once or less in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding. Wisconsin law allows the delineation of flood-prone zones in rural areas on the basis of soil survey maps.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 18 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 18.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or

small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 18 shows the expected total subsidence, which usually is a result of oxidation.

Not shown in the table is subsidence caused by an imposed surface load or by the withdrawal of ground water throughout an extensive area as a result of lowering the water table.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 19 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Wisconsin Department of Transportation, Division of Highways and Transportation Facilities.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(9)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Psamment (*Psamm*, meaning sandy, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Udipsamments (*Udi*, meaning formed in a humid climate, plus *psamment*, the suborder of the Entisols that is sandy).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Udipsamments.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is mixed, frigid Typic Udipsamments.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (7)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (9)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Algansee Series

The Algansee series consists of deep, somewhat poorly drained soils on flood plains. These soils are

rapidly permeable. They formed in a thin layer of loamy alluvium underlain by fine sand alluvium. Slope ranges from 0 to 3 percent.

Typical pedon of Algansee fine sandy loam, in an area of Algansee-Glendora fine sandy loams, 0 to 3 percent slopes; approximately 1,700 feet south and 650 feet east of the northwest corner of sec. 3, T. 17 N., R. 2 E.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) fine sandy loam, brown (10YR 4/3) dry; weak fine granular structure; friable; many very fine and few coarse roots; very strongly acid; clear smooth boundary.

C1—5 to 13 inches; dark yellowish brown (10YR 4/4) fine sand; common medium distinct yellowish brown (10YR 5/6) and common medium faint brown (10YR 5/3) mottles; single grain; loose; common very fine roots; few discontinuous strata of dark yellowish brown (10YR 4/4) fine sandy loam less than 1 inch thick; very strongly acid; clear wavy boundary.

C2—13 to 39 inches; light yellowish brown (10YR 6/4) fine sand; common medium distinct light gray (10YR 7/2) and yellowish brown (10YR 5/6) mottles; single grain; loose; few very fine roots; few discontinuous strata of light yellowish brown (10YR 6/4) fine sandy loam less than 1 inch thick; very strongly acid; gradual wavy boundary.

C3—39 to 60 inches; light yellowish brown (10YR 6/4) fine sand; common medium distinct gray (10YR 5/1) and common medium prominent strong brown (7.5YR 5/6) mottles; single grain; loose; few discontinuous strata of light yellowish brown (10YR 6/4) fine sandy loam and grayish brown (10YR 5/2) fine sand less than 1 inch thick; very strongly acid.

The A horizon has hue of 10YR, 7.5YR, or 5YR; value of 2 or 3; and chroma of 1 or 2. It is 1 to 7 inches thick. The C horizon has hue of 10YR, 7.5YR, or 5YR; value of 3 to 6; and chroma of 2 to 4. It is dominantly fine sand or loamy fine sand, but in some pedons it is sand or loamy sand or has thin strata of sandy loam, fine sandy loam, or loam.

Billett Series

The Billett series consists of deep, well drained and moderately well drained soils on stream terraces. These soils are moderately rapidly permeable. They formed dominantly in loamy deposits underlain by sandy deposits. Slope ranges from 1 to 12 percent.

Typical pedon of Billett sandy loam, moderately well drained, 1 to 6 percent slopes, approximately 1,320 feet north and 150 feet west of the center of sec. 24, T. 16 N., R. 2 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; many very fine, common fine, and few medium and coarse roots; slightly acid; abrupt smooth boundary.

BE—9 to 15 inches; brown (10YR 4/3) sandy loam; weak medium platy structure parting to weak very fine and fine subangular blocky; friable; few very fine and fine roots; neutral; gradual wavy boundary.

Bt1—15 to 25 inches; dark yellowish brown (10YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; patchy faint brown (10YR 4/3) clay films on faces of some peds and in pores and channels; slightly acid; gradual wavy boundary.

Bt2—25 to 34 inches; brown (7.5YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; patchy faint brown (7.5YR 4/4) clay films on faces of most peds and in pores and channels; medium acid; abrupt irregular boundary.

BC—34 to 36 inches; yellowish brown (10YR 5/6) sand; weak coarse subangular blocky structure; very friable; medium acid; abrupt smooth boundary.

C—36 to 60 inches; light yellowish brown (10YR 6/4) sand; common fine and medium prominent strong brown (7.5YR 5/8) mottles; single grain; loose; common strata of light brown (7.5YR 6/4) sandy loam less than 1 inch thick; strongly acid.

The thickness of the solum ranges from 24 to 40 inches. The Ap or A horizon has hue of 10YR or 7.5YR and value and chroma of 2 or 3. The Bt horizon has value of 4 to 6 and chroma of 3 to 6. It is sandy loam or fine sandy loam. The C horizon has value of 5 or 6 and chroma of 4 to 6. It is sand, loamy sand, fine sand, or loamy fine sand.

Boone Series

The Boone series consists of moderately deep, excessively drained soils on uplands. These soils are rapidly permeable. They formed in sandy material weathered from the underlying sandstone. Slope ranges from 12 to 60 percent.

Typical pedon of Boone fine sand, in an area of

Eleva-Boone-Rock outcrop complex, 30 to 60 percent slopes; approximately 400 feet south and 1,080 feet east of the center of sec. 28, T. 16 N., R. 2 E.

A—0 to 2 inches; dark grayish brown (10YR 4/2) fine sand, light brownish gray (10YR 6/2) dry; weak fine and medium granular structure; loose; many very fine and fine roots; medium acid; abrupt smooth boundary.

C1—2 to 8 inches; yellowish brown (10YR 5/4) fine sand; single grain; loose; few fine, medium, and coarse roots; strongly acid; clear smooth boundary.

C2—8 to 25 inches; yellowish brown (10YR 5/6) fine sand; single grain; loose; few medium and coarse roots; strongly acid; abrupt smooth boundary.

Cr—25 to 60 inches; brownish yellow (10YR 6/6) and very pale brown (10YR 7/4), partly consolidated sandstone.

The depth to sandstone ranges from 20 to 40 inches. The content of gravel ranges from 0 to 15 percent, by volume, in the sandy layers.

The A horizon ranges from 2 to 5 inches in thickness. It has value of 3 to 5 and chroma of 1 to 3. The C horizon has value of 4 to 8 and chroma of 1 to 6. It is sand, fine sand, or coarse sand. The Cr horizon has value of 5 to 8 and chroma of 2 to 6.

Curran Series

The Curran series consists of deep, somewhat poorly drained soils on stream and lake terraces. These soils formed dominantly in loess or other silty deposits underlain by sandy deposits. Permeability is moderate in the subsoil and rapid in the substratum. Slope ranges from 0 to 3 percent.

Typical pedon of Curran silt loam, 0 to 3 percent slopes, approximately 650 feet south and 1,240 feet west of the center of sec. 28, T. 15 N., R. 3 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; common very fine and fine roots; neutral; abrupt smooth boundary.

BE—9 to 15 inches; brown (10YR 5/3) silt loam; common medium faint grayish brown (10YR 5/2) and common medium prominent yellowish brown (10YR 5/8) mottles; weak medium platy structure parting to weak very fine and fine subangular blocky; friable; common very fine and fine roots; very dark grayish brown (10YR 3/2) soil in worm and root channels; neutral; gradual wavy boundary.

Btg1—15 to 26 inches; grayish brown (10YR 5/2) silty clay loam; common medium faint brown (10YR 5/3) and common medium prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to strong very fine and fine subangular blocky; friable; common very fine and fine roots; patchy faint grayish brown (10YR 5/2) clay films on faces of peds and in pores and channels; strongly acid; clear wavy boundary.

Btg2—26 to 35 inches; light brownish gray (10YR 6/2) silt loam; common medium faint brown (10YR 5/3) and common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium and coarse prismatic structure parting to strong fine and medium angular and subangular blocky; friable; common very fine and fine roots; patchy faint grayish brown (10YR 5/2) clay films on faces of peds and in pores and channels; strongly acid; clear wavy boundary.

Btg3—35 to 48 inches; light brownish gray (10YR 6/2) silt loam; common medium faint brown (10YR 5/3) and many coarse prominent yellowish brown (10YR 5/8) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; friable; common very fine roots; patchy faint grayish brown (10YR 5/2) clay films on faces of peds and in pores and channels; strongly acid; clear wavy boundary.

2Bt—48 to 53 inches; yellowish brown (10YR 5/4), stratified silt loam, loam, sandy loam, and loamy sand; common coarse distinct light brownish gray (2.5Y 6/2) and common medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; very friable; few very fine roots; patchy faint brown (10YR 5/3) clay films on faces of peds and in pores and channels; strongly acid; clear wavy boundary.

2C—53 to 60 inches; yellowish brown (10YR 5/6) loamy sand; single grain; loose; strongly acid.

The thickness of the solum ranges from 45 to 60 inches. The thickness of the silty mantle ranges from 40 to 50 inches.

The Ap or A horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or 3. It is silt loam or silty clay loam. The 2Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is stratified sandy loam, loam, or silt loam that has thin strata and pockets of sand or loamy sand. The 2C horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 6. It is fine sand, sand, or loamy sand.

Dawson Series

The Dawson series consists of deep, very poorly drained soils on outwash plains, on stream terraces, and in basins of glacial lakes. These soils formed in organic material underlain by sandy outwash or lacustrine deposits. Permeability is moderately slow to moderately rapid in the organic layer and rapid in the substratum. Slope is 0 to 1 percent.

Typical pedon of Dawson muck, in an area of Newson-Dawson complex, 0 to 2 percent slopes; approximately 2,660 feet north and 60 feet west of the southeast corner of sec. 3, T. 20 N., R. 3 E.

Oa1—0 to 6 inches; black (10YR 2/1), broken face, and black (N 2/0), rubbed, sapric material; about 10 percent fibers, 5 percent rubbed; massive; primarily herbaceous fibers; very strongly acid (pH 4.6 in water); gradual smooth boundary.

Oa2—6 to 37 inches; very dark brown (10YR 2/2), broken face, and black (N 2/0), rubbed, sapric material; about 8 percent fibers, 4 percent rubbed; massive; primarily herbaceous fibers; very strongly acid (pH 4.6 in water); gradual smooth boundary.

C—37 to 60 inches; dark grayish brown (10YR 4/2) sand; single grain; loose; strongly acid (pH 5.5 in water).

The thickness of the organic layer ranges from 16 to 51 inches and coincides with the depth to sand. The organic layer has hue of 10YR, 7.5YR, or 5YR or is neutral in hue. It has value of 2 to 4 and chroma of 0 to 3. Some pedons have as much as 10 inches of hemic material or 5 inches of fibric material in the subsurface tier. The C horizon has hue of 7.5YR, 10YR, or 2.5Y; value of 4 to 6; and chroma of 1 to 6. It is sand, fine sand, or loamy fine sand.

Delton Series

The Delton series consists of deep, moderately well drained soils on stream and lake terraces. These soils formed in sandy deposits and in the underlying clayey lacustrine deposits. Permeability is moderately rapid in the upper part of the subsoil and slow or very slow in the lower part and in the substratum. Slope ranges from 1 to 6 percent.

Typical pedon of Delton loamy fine sand, moderately well drained, 1 to 6 percent slopes, approximately 700 feet east and 450 feet north of the center of sec. 23, T. 15 N., R. 4 E.

Ap—0 to 10 inches; dark brown (7.5YR 3/2) loamy fine sand, brown (7.5YR 4/2) dry; weak fine and medium subangular blocky structure; very friable; common very fine and fine and few medium and coarse roots; strongly acid; abrupt smooth boundary.

BE1—10 to 22 inches; brown (7.5YR 4/4) fine sand; weak fine and medium subangular blocky structure; very friable; common very fine and fine and few medium and coarse roots; slightly acid; gradual smooth boundary.

BE2—22 to 30 inches; brown (7.5YR 4/4) fine sand; common fine distinct strong brown (7.5YR 5/6) mottles; weak fine and medium subangular blocky structure; very friable; few very fine, fine, and medium roots; slightly acid; clear wavy boundary.

Bt1—30 to 36 inches; brown (7.5YR 4/4) fine sandy loam; common fine distinct strong brown (7.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; few very fine, fine, and medium roots; patchy faint brown (7.5YR 4/4) clay films on faces of some peds and in pores and channels; light gray (10YR 7/2 dry) silt and very fine sand grains coating faces of most peds; common black (10YR 2/1) iron and manganese accumulations; slightly acid; clear wavy boundary.

2Bt2—36 to 41 inches; reddish brown (5YR 4/4) silty clay; few fine prominent strong brown (7.5YR 5/6) mottles; strong medium and coarse prismatic structure parting to strong very fine and fine angular blocky; very firm; few very fine, fine, and medium roots; many faint reddish brown (5YR 4/3) clay films on faces of peds and in pores and channels; light gray (10YR 7/2 dry) silt and very fine sand grains coating faces of some peds; common black (10YR 2/1) iron and manganese accumulations; strongly acid; gradual wavy boundary.

2Bt3—41 to 48 inches; reddish brown (5YR 4/4) clay; few fine distinct yellowish red (5YR 5/6) mottles; strong medium and coarse prismatic structure parting to strong very fine and fine angular blocky; very firm; few very fine and fine roots; patchy faint reddish brown (5YR 4/3) clay films on faces of some peds and in pores and channels; light gray (10YR 7/2 dry) silt and very fine sand grains coating faces of some peds; common black (10YR 2/1) iron and manganese accumulations; strongly acid; gradual wavy boundary.

2C—48 to 60 inches; reddish brown (5YR 4/4) clay; massive; very firm; common black (10YR 2/1) iron and manganese accumulations; medium acid.

The thickness of the solum ranges from 30 to 50 inches. The thickness of the sandy mantle ranges from 20 to 40 inches.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 or 3. The A horizon, where it occurs, is 3 to 5 inches thick. It has colors similar to those of the Ap horizon. The BE horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is fine sand, loamy fine sand, sand, or loamy sand. The Bt horizon has hue of 5YR, 7.5YR, or 10YR; value of 4 to 6; and chroma of 3 to 6. It is loam, sandy loam, or fine sandy loam. The 2Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 3 or 4. It is silty clay loam, silty clay, or clay. The 2C horizon has colors and textures similar to those of the 2Bt horizon.

Eleva Series

The Eleva series consists of moderately deep, somewhat excessively drained soils on uplands and lake terraces. These soils are moderately permeable or moderately rapidly permeable. They formed in loamy deposits or in loamy material weathered from the underlying sandstone. Slope ranges from 2 to 60 percent.

Typical pedon of Eleva sandy loam, in an area of Eleva-Boone-Rock outcrop complex, 30 to 60 percent slopes; approximately 2,240 feet north and 150 feet west of the southeast corner of sec. 25, T. 14 N., R. 3 E.

A—0 to 2 inches; dark grayish brown (10YR 4/2) sandy loam, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; about 5 percent sandstone gravel; many very fine, fine, medium, and coarse roots; extremely acid; abrupt smooth boundary.

BE—2 to 6 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; very friable; common very fine, fine, medium, and coarse roots; about 5 percent sandstone gravel; extremely acid; clear smooth boundary.

Bt1—6 to 15 inches; yellowish brown (10YR 5/4) sandy loam; weak medium and fine subangular blocky structure; very friable; few very fine, fine, and medium roots; patchy faint yellowish brown (10YR 5/4) clay films on faces of peds; about 10 percent sandstone gravel; extremely acid; gradual smooth boundary.

Bt2—15 to 26 inches; yellowish brown (10YR 5/4) sandy loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; patchy faint yellowish brown (10YR 5/4) clay films on faces of peds; clay bridging between sand grains; about 10 percent sandstone gravel; extremely acid; abrupt irregular boundary.

R—26 inches; strong brown (7.5YR 4/6 and 5/6) sandstone.

The thickness of the solum and the depth to sandstone range from 20 to 40 inches. The content of gravel ranges from 0 to 10 percent throughout the pedon.

The A horizon ranges from 2 to 4 inches in thickness. It has value of 3 or 4 and chroma of 1 to 3. The Ap horizon, where it occurs, ranges from 6 to 10 inches in thickness. It has value of 3 or 4 and chroma of 2 or 3. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is sandy loam, fine sandy loam, or loam. The C horizon, where it occurs, has hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 4 to 6. It is fine sand, loamy sand, or sand.

Elkmound Series

The Elkmound series consists of shallow, well drained soils on uplands and lake terraces. These soils are moderately permeable or moderately rapidly permeable. They formed in loamy deposits underlain by sandstone. Slope ranges from 1 to 6 percent.

Typical pedon of Elkmound sandy loam, 1 to 6 percent slopes, approximately 100 feet south and 1,875 feet west of the center of sec. 1, T. 15 N., R. 4 E.

A—0 to 2 inches; very dark gray (10YR 3/1) sandy loam, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; many very fine and fine and common medium and coarse roots; slightly acid; clear smooth boundary.

Bw1—2 to 10 inches; brown (10YR 4/3) sandy loam; weak medium and coarse subangular blocky structure; friable; many very fine and fine and common medium and coarse roots; slightly acid; clear smooth boundary.

Bw2—10 to 16 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; friable; common very fine and fine roots; slightly acid; abrupt smooth boundary.

R—16 inches; reddish brown (2.5YR 4/4) and yellowish red (5YR 5/8) platy sandstone.

The thickness of the solum and the depth to sandstone range from 10 to 20 inches. The content of sandstone gravel and cobbles ranges from 0 to 5 percent.

The A horizon ranges from 2 to 4 inches in thickness. It has value of 2 or 3 and chroma of 1 or 2. The Ap

horizon, where it occurs, has value of 3 or 4 and chroma of 2 or 3. The Bw horizon has value of 3 to 5. It is loam or sandy loam.

Ettrick Series

The Ettrick series consists of deep, poorly drained and very poorly drained soils on flood plains, low stream terraces, and lake terraces. These soils formed in silty alluvium over sandy deposits. Permeability is moderately slow in the silty alluvium and moderate or moderately rapid in the substratum. Slope ranges from 0 to 2 percent.

Typical pedon of Ettrick silt loam, 0 to 2 percent slopes, approximately 75 feet north and 2,440 feet east of the center of sec. 2, T. 14 N., R. 3 E.

Ap—0 to 11 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak coarse subangular blocky structure; friable; few very fine, fine, medium, and coarse roots; slightly acid; abrupt smooth boundary.

Bg1—11 to 17 inches; grayish brown (2.5Y 5/2) silt loam; many fine prominent strong brown (7.5YR 5/8) mottles; weak very fine and fine angular blocky structure; firm; few very fine, fine, medium, and coarse roots; neutral; clear smooth boundary.

Bg2—17 to 26 inches; light olive gray (5Y 6/2) silt loam; common fine prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; firm; few very fine and fine roots; neutral; clear smooth boundary.

Bg3—26 to 36 inches; olive gray (5Y 5/2) silt loam; few fine prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to weak fine subangular blocky; firm; few very fine and fine roots; neutral; gradual smooth boundary.

Bg4—36 to 44 inches; light olive gray (5Y 6/2) silt loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; few very fine and fine roots; neutral; gradual smooth boundary.

2Cg1—44 to 55 inches; olive gray (5Y 5/2) silt loam; common medium prominent strong brown (7.5YR 5/6) mottles; massive; friable; thin discontinuous strata and pockets of olive gray (5Y 5/2) sand; mildly alkaline; gradual smooth boundary.

2Cg2—55 to 60 inches; olive gray (5Y 5/2) loamy fine sand; few coarse prominent reddish yellow (7.5YR 6/6) and common fine prominent red (2.5YR 4/6) mottles; single grain; loose; mildly alkaline.

The thickness of the solum ranges from 30 to 50 inches. The thickness of the silty mantle ranges from 40 to more than 60 inches.

The A horizon, where it occurs, has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 1 or 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is silt loam or silty clay loam. The C horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 6. It is stratified silt loam to fine sand.

Friendship Series

The Friendship series consists of deep, moderately well drained soils on outwash plains, on stream terraces, and in basins of glacial lakes. These soils formed in sandy outwash or lacustrine deposits. Permeability is rapid, except in the loamy substratum phase. In this phase, permeability is rapid in the upper part and moderate below a depth of 40 inches. Slope ranges from 1 to 6 percent.

Typical pedon of Friendship sand, 1 to 6 percent slopes, approximately 2,540 feet south and 55 feet east of the northwest corner of sec. 11, T. 20 N., R. 4 E.

A—0 to 2 inches; black (10YR 2/1) sand, very dark gray (10YR 3/1) dry; weak fine granular structure; very friable; many very fine and fine and few medium and coarse roots; strongly acid; abrupt irregular boundary.

Bw1—2 to 14 inches; brown (7.5YR 4/4) sand; weak medium subangular blocky structure; very friable; common very fine and fine and few medium and coarse roots; strongly acid; gradual wavy boundary.

Bw2—14 to 20 inches; brown (7.5YR 4/4) sand; weak medium and coarse subangular blocky structure; very friable; common very fine and fine and few medium and coarse roots; strongly acid; gradual wavy boundary.

BC—20 to 29 inches; dark yellowish brown (10YR 4/4) sand; weak coarse subangular blocky structure; very friable; common very fine and fine and few medium roots; strongly acid; gradual irregular boundary.

C1—29 to 36 inches; dark yellowish brown (10YR 4/4) sand; common fine and medium prominent strong brown (7.5YR 4/6) and few fine and medium prominent yellowish red (5YR 4/6) mottles; single grain; loose; few very fine and fine roots; medium acid; clear wavy boundary.

C2—36 to 52 inches; yellowish brown (10YR 5/4) sand; common fine and medium distinct yellowish brown

(10YR 5/6) and few fine and medium prominent strong brown (7.5YR 4/6) mottles; single grain; loose; few very fine and fine roots; medium acid; clear wavy boundary.

C3—52 to 60 inches; yellowish brown (10YR 5/4) sand; common fine and medium prominent strong brown (7.5YR 4/6) and common medium distinct grayish brown (10YR 5/2) mottles; single grain; loose; medium acid.

The thickness of the solum ranges from 20 to 40 inches. The content of gravel ranges from 0 to 15 percent throughout the pedon.

The A horizon ranges from 2 to 4 inches in thickness. It has value of 2 or 3 and chroma of 1 to 3. The Ap horizon, where it occurs, is 5 to 9 inches thick. The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It 's sand, fine sand, or loamy sand. The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6. The C horizon in the loamy substratum phase has hue of 5YR, 7.5YR, or 10YR; value of 4 to 6; and chroma of 4 to 8. It is loam or sandy loam.

Gale Series

The Gale series consists of moderately deep, well drained soils on uplands. These soils formed dominantly in loess and are underlain by sandy residuum and sandstone. Permeability is moderate in the subsoil and rapid in the substratum. Slope ranges from 2 to 12 percent.

Typical pedon of Gale silt loam, 2 to 6 percent slopes, approximately 2,015 feet north and 805 feet east of the southwest corner of sec. 12, T. 15 N., R. 3 E.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate coarse subangular blocky structure parting to moderate medium subangular blocky; friable; common very fine and fine roots; slightly acid; abrupt smooth boundary.

Bt1—8 to 14 inches; brown (7.5YR 4/4) silt loam; moderate medium and fine subangular blocky structure; firm; common very fine and fine roots; patchy faint brown (7.5YR 4/4) clay films on faces of peds and in pores and channels; very strongly acid; clear smooth boundary.

Bt2—14 to 23 inches; brown (7.5YR 4/4) silt loam; moderate fine subangular blocky structure; firm; few very fine roots; patchy faint brown (7.5YR 4/4) clay films on faces of peds and in pores and channels; very strongly acid; clear smooth boundary.

2BC—23 to 27 inches; strong brown (7.5YR 5/6) sandy loam; weak coarse subangular blocky structure parting to weak medium subangular blocky; friable; few very fine roots; very strongly acid; clear smooth boundary.

2C—27 to 38 inches; reddish yellow (7.5YR 6/6) sand; single grain; loose; very strongly acid; clear smooth boundary.

2Cr—38 to 60 inches; strong brown (7.5YR 5/6), partly consolidated sandstone.

The thickness of the solum ranges from 18 to 38 inches. The depth to sandstone ranges from 20 to 40 inches.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. The A horizon, where it occurs, is 2 to 4 inches thick. It has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or silty clay loam. The 2C horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. It is loamy sand or sand. In many pedons the 2Cr horizon becomes more difficult to dig with depth.

Glendora Series

The Glendora series consists of deep, poorly drained and very poorly drained, rapidly permeable soils on flood plains. These soils formed in a thin layer of loamy alluvium underlain by fine sand alluvium. Slope ranges from 0 to 3 percent.

Typical pedon of Glendora fine sandy loam, in an area of Algansee-Glendora fine sandy loams, 0 to 3 percent slopes; approximately 740 feet south and 900 feet west of the northeast corner of sec. 18, T. 15 N., R. 4 E.

A—0 to 7 inches; black (10YR 2/1) fine sandy loam, dark gray (10YR 4/1) dry; strong fine and medium granular structure; friable; many very fine and fine and common medium and coarse roots; few strata of black (10YR 2/1) loam less than ½ inch thick; slightly acid; clear smooth boundary.

Cg1—7 to 22 inches; grayish brown (10YR 5/2) fine sand; many medium prominent strong brown (7.5YR 5/6) and many coarse prominent dark brown (7.5YR 4/4) mottles; single grain; loose; few very fine, fine, medium, and coarse roots; few black (10YR 2/1) organic stains within the larger root channels; medium acid; gradual smooth boundary.

Cg2—22 to 50 inches; grayish brown (10YR 5/2) fine

sand; common coarse prominent strong brown (7.5YR 5/6) and dark brown (7.5YR 4/4) mottles; single grain; loose; few strata of grayish brown (10YR 5/2) sand and loamy fine sand less than 1 inch thick; slightly acid; gradual smooth boundary.

Cg3—50 to 60 inches; gray (10YR 5/1) fine sand; few coarse prominent strong brown (7.5YR 5/6) and dark brown (7.5YR 4/4) mottles; single grain; loose; medium acid.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is dominantly fine sand or loamy fine sand, but in some pedons it has strata of sand or loamy sand.

Hixton Variant

The Hixton Variant consists of moderately deep, somewhat poorly drained, moderately rapidly permeable soils on uplands and stream and lake terraces. These soils formed mostly in loamy material weathered from sandstone or in loamy, water-laid deposits. Slope ranges from 0 to 3 percent.

Typical pedon of Hixton Variant loam, 0 to 3 percent slopes, approximately 125 feet south and 1,110 feet east of the northwest corner of sec. 16, T. 14 N., R. 5 E.

A—0 to 4 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure; very friable; common very fine, fine, and medium roots; very strongly acid; abrupt smooth boundary.

Bt1—4 to 9 inches; brown (10YR 4/3) loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common very fine and fine roots; patchy faint brown (10YR 4/3) clay films on faces of some peds and in pores and channels; very strongly acid; clear smooth boundary.

Bt2—9 to 16 inches; dark yellowish brown (10YR 4/4) loam; common fine prominent strong brown (7.5YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; moderate medium and coarse subangular blocky structure; friable; common very fine and fine roots; patchy faint dark yellowish brown (10YR 4/4) clay films on faces of most peds and in pores and channels; very strongly acid; clear smooth boundary.

Bt3—16 to 21 inches; dark yellowish brown (10YR 4/4) sandy loam; many medium distinct grayish brown (10YR 5/2) and common medium and coarse distinct yellowish brown (10YR 5/6) mottles; moderate medium and coarse subangular blocky structure; friable; common very fine and fine roots; patchy faint dark yellowish brown (10YR 4/4) clay films on faces of most peds and in pores and channels; few black (10YR 2/1) iron and manganese accumulations; very strongly acid; clea wavy boundary.

C—21 to 27 inches; grayish brown (10YR 5/2) loamy sand; common medium prominent yellowish brown (10YR 5/6) and common fine faint light brownish gray (10YR 6/2) mottles; single grain; loose; few fine roots; few black (10YR 2/1) and common dark reddish brown (5YR 3/2) iron and manganese accumulations; very strongly acid; abrupt smooth boundary.

Cr—27 to 60 inches; mixed pale brown (10YR 6/3) and strong brown (7.5YR 5/8), partly consolidated sandstone.

The thickness of the solum and the depth to sandstone range from 20 to 40 inches. The A horizon ranges from 1 to 4 inches in thickness. It has value of 2 or 3 and chroma of 1 or 2. The Ap horizon, where it occurs, has value and chroma of 2 or 3. The Bt horizon has hue of 7.5YR, 10YR, or 2.5Y; value of 4 to 7; and chroma of 1 to 8. It is fine sandy loam, sandy loam, or loam. The C horizon has colors similar to those of the Bt horizon. It is sand, fine sand, loamy sand, or loamy fine sand. The solum or the substratum is underlain by either a Cr horizon, an R horizon, or a Cr horizon that grades to an R horizon with depth.

Jackson Series

The Jackson series consists of deep, moderately well drained soils on stream and lake terraces. These soils formed dominantly in loess or other silty deposits underlain by sandy deposits. Permeability is moderate in the subsoil and rapid in the substratum. Slope ranges from 2 to 6 percent.

Typical pedon of Jackson silt loam, 2 to 6 percent slopes, approximately 960 feet north and 1,260 feet west of the center of sec. 28, T. 15 N., R. 3 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine and medium subangular blocky structure; friable; few very fine roots; neutral; abrupt smooth boundary.

BE—9 to 14 inches; brown (10YR 4/3) silt loam; weak

fine and medium subangular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

Bt1—14 to 22 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; firm; few very fine roots; patchy faint dark yellowish brown (10YR 4/4) clay films on faces of some peds and in pores and channels; neutral; clear smooth boundary.

Bt2—22 to 38 inches; dark yellowish brown (10YR 4/4) silt loam; moderate very fine and fine subangular blocky structure; firm; patchy faint dark yellowish brown (10YR 4/4) clay films on faces of most peds and in pores and channels; light gray (10YR 7/2 dry) silt grains coating faces of some peds; neutral; gradual smooth boundary.

Bt3—38 to 45 inches; dark yellowish brown (10YR 4/4) silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; patchy faint dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores and channels; light gray (10YR 7/2 dry) silt grains coating faces of some peds; strongly acid; gradual smooth boundary.

Bt4—45 to 56 inches; brown (7.5YR 4/4) sandy loam; common medium prominent dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; patchy faint brown (7.5YR 4/4) clay films on faces of peds and in pores and channels; discontinuous strata of silt loam and loamy sand less than 1 inch thick; strongly acid; gradual smooth boundary.

2C—56 to 60 inches; brown (7.5YR 4/4) loamy sand; common medium prominent dark yellowish brown (10YR 4/6) and common fine distinct strong brown (7.5YR 5/6) mottles; single grain; loose; few discontinuous strata and pockets of sandy loam and sand less than 1 inch thick; strongly acid.

The thickness of the solum ranges from 45 to 60 inches. The thickness of the silty deposits ranges from 40 to 55 inches.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. The A horizon, where it occurs, is 2 to 4 inches thick. The BE horizon has value of 3 to 5 and chroma of 3 or 4. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or silty clay loam in the upper part and silt loam, loam, or sandy loam in the lower part. The 2C horizon has hue of 10YR or 7.5YR, value of 4 to 7, and chroma of 3 to 6. It is sand or loamy sand.

Korobago Series

The Korobago series consists of deep, somewhat poorly drained soils on stream and lake terraces. These soils formed in loamy deposits and in the underlying clayey lacustrine deposits. Permeability is moderate in the loamy upper part of the soil and moderately slow or slow in the clayey lower part. Slope ranges from 0 to 3 percent.

Typical pedon of Korobago sandy loam, 0 to 3 percent slopes, approximately 80 feet south and 140 feet west of the center of sec. 20, T. 15 N., R. 4 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; weak very fine and fine subangular blocky structure; friable; common very fine and fine and few medium and coarse roots; mildly alkaline; abrupt smooth boundary.

Bw1—9 to 18 inches; brown (10YR 4/3) sandy loam; many fine prominent strong brown (7.5YR 4/6) and few fine distinct dark gray (10YR 4/1) mottles; weak medium and coarse subangular blocky structure; friable; few very fine and fine roots; very dark grayish brown (10YR 3/2) soil in worm and root channels; neutral; clear smooth boundary.

Bw2—18 to 29 inches; brown (7.5YR 4/4) sandy loam; many medium prominent yellowish red (5YR 5/8) and common fine distinct olive gray (5Y 5/2) mottles; weak medium and coarse prismatic structure; friable; few very thin strata of brown (10YR 5/3) sand less than ½ inch thick; neutral; abrupt wavy boundary.

2Bw3—29 to 45 inches; reddish brown (5YR 4/4) silty clay; common medium prominent yellowish red (5YR 5/8) and few fine prominent gray (5Y 6/1) mottles; weak medium and coarse prismatic structure; firm; neutral; gradual wavy boundary.

2C—45 to 60 inches; reddish brown (5YR 4/4) silty clay; common medium prominent yellowish red (5YR 5/8) mottles; massive; firm; few yellowish brown (10YR 5/4) calcium carbonate accumulations; strongly effervescent; moderately alkaline.

The thickness of the solum ranges from 24 to 45 inches. The thickness of the loamy upper part ranges from 20 to 40 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The A horizon, where it occurs, has hue of 10YR, value of 2 or 3, and chroma of 1. It is 3 to 5 inches thick. The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. It is sandy loam or

loam. The 2Bw horizon has value of 4 or 5 and chroma of 3 or 4. It is dominantly silty clay loam, silty clay, or clay, but in some pedons it has thin strata of silt loam. The 2C horizon has colors and textures similar to those of the 2Bw horizon.

La Farge Series

The La Farge series consists of moderately deep, well drained, moderately permeable soils on uplands. These soils formed dominantly in loess underlain by glauconitic sandstone. Slope ranges from 2 to 20 percent.

Typical pedon of La Farge silt loam, 6 to 12 percent slopes, eroded, approximately 1,850 feet south and 120 feet west of the northeast corner of sec. 23, T. 14 N., R. 4 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak fine and very fine subangular blocky structure; friable; common very fine and fine and few medium and coarse roots; some dark yellowish brown (10YR 4/4) soil mixed in by plowing; slightly acid; gradual smooth boundary.

Bt1—8 to 12 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine and very fine angular and subangular blocky structure; firm; common very fine and few fine, medium, and coarse roots; some dark grayish brown (10YR 4/2) soil in worm and root channels; patchy faint dark yellowish brown (10YR 4/4) clay films on faces of some peds and in pores and channels; medium acid; clear smooth boundary.

Bt2—12 to 22 inches; dark yellowish brown (10YR 4/4) silt loam; strong fine and very fine angular and subangular blocky structure; firm; common very fine and few fine, medium, and coarse roots; patchy faint dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores and channels; very strongly acid; gradual wavy boundary.

Bt3—22 to 30 inches; dark yellowish brown (10YR 4/4) silt loam; moderate very fine, fine, and medium angular and subangular blocky structure; firm; few very fine, fine, medium, and coarse roots; patchy faint dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores and channels; very strongly acid; clear wavy boundary.

2Bt4—30 to 36 inches; dark yellowish brown (10YR 4/4) loam; moderate fine and medium angular and subangular blocky structure; friable; few very fine, fine, and medium roots; thin patchy clay films on faces of peds and in pores and channels; patchy faint dark yellowish brown (10YR 4/4) clay films on faces of some peds and on sandstone fragments in the lower part of the horizon; about 12 percent sandstone gravel and channers; very strongly acid; clear smooth boundary.

2Cr—36 to 60 inches; yellowish brown (10YR 5/4), partly consolidated sandstone that has many grains of grayish green (5G 4/2) glauconite; some strata of grayish green (5G 4/2) glauconitic sandstone, 3/16 to 1 inch thick, with many yellowish brown (10YR 5/4) sand grains.

The thickness of the solum and the depth to sandstone range from 20 to 40 inches. The content of sandstone gravel and channers ranges from 0 to 15 percent in the lower part of the subsoil.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. The A horizon, where it occurs, ranges from 2 to 5 inches in thickness. It has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 or 4. It is silt loam or silty clay loam. The 2Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 6. It is fine sandy loam, sandy loam, loam, or clay loam. The 2Cr horizon has hue of 10YR, 2.5Y, 5Y, or 5G; value of 4 to 7; and chroma of 2 to 8.

Lows Series

The Lows series consists of deep, poorly drained soils on stream and lake terraces. These soils formed in loamy deposits underlain by sandy deposits. Permeability is moderate in the subsoil and rapid in the substratum. Slope ranges from 0 to 2 percent.

Typical pedon of Lows loam, 0 to 2 percent slopes, approximately 1,375 feet north and 825 feet west of the southeast corner of sec. 16, T. 15 N., R. 4 E.

Ap—0 to 9 inches; black (10YR 2/1) loam, dark grayish brown (10YR 4/2) dry; weak medium and coarse subangular blocky structure; friable; common very fine and few fine and medium roots; slightly acid; abrupt smooth boundary.

Bg1—9 to 16 inches; dark gray (10YR 4/1) loam; many fine distinct yellowish brown (10YR 5/4) mottles; moderate medium and coarse subangular blocky structure; friable; few very fine, fine, and medium roots; very dark gray (10YR 3/1) organic coatings on faces of some peds and in pores and channels; slightly acid; clear smooth boundary.

Bg2—16 to 23 inches; light brownish gray (10YR 6/2) loam; many fine and medium prominent strong

brown (7.5YR 5/6) mottles; moderate medium and fine subangular blocky structure; friable; few very fine roots; slightly acid; clear wavy boundary.

Bg3—23 to 28 inches; light brownish gray (10YR 6/2) loam; common fine faint light gray (10YR 6/1) and many fine and medium prominent strong brown (7.5YR 5/6) mottles; strong medium and fine subangular blocky structure; friable; few very fine roots; few discontinuous strata of silt loam less than 1 inch thick; slightly acid; abrupt wavy boundary.

2C1—28 to 42 inches; light gray (10YR 6/1) fine sand; common coarse faint gray (10YR 5/1) and common medium prominent brownish yellow (10YR 6/6) mottles; single grain; loose; slightly acid; gradual wavy boundary.

2C2—42 to 51 inches; light brownish gray (10YR 6/2) fine sand; common fine prominent brownish yellow (10YR 6/6) mottles; single grain; loose; slightly acid; gradual wavy boundary.

2C3—51 to 60 inches; pale brown (10YR 6/3) sand; common coarse distinct very pale brown (10YR 8/4) mottles; single grain; loose; slightly acid.

The thickness of the solum ranges from 20 to 40 nches and coincides with the depth to sand. The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is silt loam, loam, or sandy clay loam. The 2C horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 to 4. It is loamy sand, sand, or fine sand.

Loxley Series

The Loxley series consists of deep, very poorly drained soils on outwash plains and in basins of glacial lakes. These soils formed in thick accumulations of organic material. Permeability is moderately slow to moderately rapid. Slope is 0 to 1 percent.

Typical pedon of Loxley muck, 0 to 1 percent slopes, approximately 1,500 feet south and 100 feet east of the northwest corner of sec. 7, T. 19 N., R. 2 E.

Oa1—0 to 8 inches; black (N 2/0), broken face and rubbed, sapric material; about 15 percent fiber, less than 5 percent rubbed; weak fine granular structure; very friable; primarily herbaceous fibers; common very fine and fine roots; extremely acid (pH 3.6 in 0.01 molar calcium chloride); clear smooth boundary.

Oa2—8 to 28 inches; black (10YR 2/1), broken face and rubbed, sapric material; about 35 percent fiber, 10 percent rubbed; weak thick platy structure; very friable; primarily herbaceous fibers; few very fine and fine roots; extremely acid (pH 3.3 in 0.01 molar calcium chloride); gradual smooth boundary.

Oa3—28 to 52 inches; black (N 2/0), broken face and rubbed, sapric material; about 10 percent fiber, less than 5 percent rubbed; massive; very friable; primarily herbaceous fibers; extremely acid (pH 3.4 in 0.01 molar calcium chloride); gradual smooth boundary.

Oa4—52 to 60 inches; very dark brown (10YR 2/2), broken face and rubbed, sapric material; about 12 percent fiber, 5 percent rubbed; massive; very friable; primarily herbaceous fibers; extremely acid (pH 3.7 in 0.01 molar calcium chloride).

Typically, the organic layer is more than 60 inches thick, but in some pedons it is as thin as 51 inches. It has hue of 10YR, 7.5YR, or 5YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. In some pedons the subsurface and bottom tiers have as much as 10 inches of hemic material.

Manawa Series

The Manawa series consists of deep, somewhat poorly drained, slowly permeable soils on stream and lake terraces. These soils formed dominantly in clayey lacustrine deposits. Slope ranges from 0 to 3 percent.

Typical pedon of Manawa silt loam, 0 to 3 percent slopes, approximately 1,800 feet north and 120 feet east of the southwest corner of sec. 29, T. 15 N., R. 4 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; common very fine and fine roots; mildly alkaline; abrupt smooth boundary.

E—9 to 14 inches; brown (10YR 4/3) silt loam, light gray (10YR 7/2) dry; common fine distinct yellowish brown (10YR 5/6) and common fine and medium faint dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) mottles; weak medium platy structure parting to weak very fine and fine subangular blocky; friable; common very fine and fine roots; very dark grayish brown (10YR 3/2) soil in some worm and root channels and coating faces of some peds; mildly alkaline; clear wavy boundary.

Bt1—14 to 18 inches; reddish brown (5YR 4/3) silty clay; common fine distinct yellowish red (5YR 5/6), few fine faint reddish brown (5YR 4/4), and few fine prominent dark grayish brown (10YR 4/2) mottles; moderate very fine and fine subangular blocky

structure; firm; common very fine and fine roots; many faint reddish brown (5YR 4/3) clay films on faces of most peds and in pores and channels; patchy faint dark reddish gray (5YR 4/2) clay films on faces of a few peds; neutral; clear irregular boundary.

Bt2—18 to 32 inches; reddish brown (5YR 4/4) clay; common fine and medium distinct dark reddish gray (5YR 4/2) and few fine and medium distinct yellowish red (5YR 5/6) mottles; strong medium prismatic structure parting to strong very fine and fine angular blocky; very firm; common very fine roots; many faint reddish brown (5YR 4/4) clay films on faces of most peds and in pores and channels; patchy distinct dark reddish gray (5YR 4/2) clay films on faces of some peds; thin patchy black (10YR 2/1) iron and manganese coatings on faces of some peds; neutral; gradual wavy boundary.

Bt3—32 to 41 inches; reddish brown (5YR 4/4) clay; common fine distinct yellowish red (5YR 5/6) mottles; strong coarse prismatic structure parting to strong medium and fine angular blocky; very firm; few very fine roots; many faint reddish brown (5YR 4/4) clay films on faces of most peds and in pores and channels; patchy prominent light gray (10YR 6/1) clay films on faces of some peds; thin patchy black (10YR 2/1) iron and manganese coatings on faces of some peds; mildly alkaline; gradual wavy boundary.

Bt4—41 to 47 inches; reddish brown (5YR 4/4) clay; common fine distinct yellowish red (5YR 5/6) mottles; moderate medium and fine subangular blocky structure; very firm; few very fine roots; many faint reddish brown (5YR 4/4) clay films on faces of most peds and in pores and channels; patchy prominent light gray (10YR 6/1) clay films on faces of some peds; thin patchy black (10YR 2/1) iron and manganese coatings on faces of some peds; moderately alkaline; gradual irregular boundary.

C—47 to 60 inches; reddish brown (5YR 4/4) silty clay; common fine distinct yellowish red (5YR 5/6) mottles; weak medium and coarse subangular blocky structure; very firm; thin patchy black (10YR 2/1) iron and manganese coatings on faces of some peds; some soft pinkish white (5YR 8/2) calcium carbonate accumulations; strongly effervescent; moderately alkaline.

The thickness of the solum ranges from 20 to 50 inches. Free carbonates are typically below the solum, but in some pedons they are in the lower part of the solum.

The Ap horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 to 3. The Bt horizon has hue of 5YR or 2.5YR, value of 3 to 5, and chroma of 3 or 4. It is silty clay or clay and may contain thin strata of silty clay loam or clay loam in some pedons. The C horizon has hue of 5YR or 2.5YR, value of 3 to 5, and chroma of 3 to 6. It is silty clay, silty clay loam, or clay.

Meehan Series

The Meehan series consists of deep, somewhat poorly drained, rapidly permeable soils on outwash plains, on stream terraces, and in basins of glacial lakes. These soils formed dominantly in medium sand outwash or lacustrine deposits. Slope ranges from 0 to 3 percent.

Typical pedon of Meehan sand, in an area of Meehan-Newson complex, 0 to 3 percent slopes; approximately 80 feet north and 1,290 feet west of the center of sec. 9, T. 20 N., R. 4 E.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) sand, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure; very friable; many very fine, fine, and medium and common coarse roots; very strongly acid; clear wavy boundary.

Bw1—4 to 12 inches; dark yellowish brown (10YR 4/6) sand; many medium distinct strong brown (7.5YR 4/6) and common fine prominent dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; very friable; common very fine and fine and few medium coarse roots; strongly acid; clear wavy boundary.

Bw2—12 to 29 inches; brown (10YR 5/3) sand; common fine prominent strong brown (7.5YR 4/6) and common fine faint grayish brown (10YR 5/2) mottles; weak medium and coarse subangular blocky structure; very friable; few very fine and fine roots; strongly acid; clear smooth boundary.

C—29 to 60 inches; light yellowish brown (10YR 6/4) sand; common medium prominent yellowish brown (10YR 5/8) and few medium distinct light brownish gray (10YR 6/2) mottles; single grain; loose; strongly acid.

The thickness of the solum ranges from 24 to 40 inches. The A horizon is 3 to 5 inches thick. It has value of 2 or 3 and chroma of 1 or 2. The Ap horizon, where it

occurs, is 6 to 10 inches thick. The Bw horizon has hue of 5YR, 7.5YR, or 10YR; value of 4 to 6; and chroma of 2 to 8. It is loamy sand or sand. The C horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 2 to 4.

Meridian Series

The Meridian series consists of deep, well drained soils on stream and lake terraces. These soils formed dominantly in loamy deposits underlain by sandy deposits. Permeability is moderate in the loamy part of the subsoil and rapid in the substratum. Slope ranges from 2 to 6 percent.

Typical pedon of Meridian loam, 2 to 6 percent slopes, approximately 320 feet north and 2,480 feet east of the southwest corner of sec. 4, T. 15 N., R. 3 E.

Ap—0 to 7 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; weak medium and coarse subangular blocky structure; friable; few coarse and medium and common very fine and fine roots; slightly acid; abrupt smooth boundary.

Bt1—7 to 14 inches; dark yellowish brown (10YR 4/4) loam; moderate medium and coarse subangular blocky structure; friable; few very fine and fine roots; patchy faint brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—14 to 23 inches; brown (7.5YR 4/4) loam; moderate medium and coarse subangular blocky structure; friable; few very fine and fine roots; patchy faint brown (7.5YR 4/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

BC1—23 to 27 inches; strong brown (7.5YR 4/6) sandy loam; weak medium subangular blocky structure; very friable; few very fine roots; strongly acid; clear smooth boundary.

2BC2—27 to 39 inches; strong brown (7.5YR 5/6) loamy sand; single grain; loose; strongly acid; clear smooth boundary.

2C—39 to 60 inches; reddish yellow (7.5YR 6/6) sand; single grain; loose; few discontinuous strata of reddish yellow (7.5YR 7/8) sand less than 1 inch thick; about 5 percent sandstone gravel; strongly acid.

The thickness of the solum ranges from 25 to 40 inches. The content of sandstone gravel ranges from 0 to 5 percent in the substratum.

The Ap horizon has value and chroma of 2 or 3. The Bt horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6. It is loam or sandy clay loam. The 2C horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 6. It is sand or loamy sand.

NewGlarus Series

The NewGlarus series consists of moderately deep, well drained soils on uplands. These soils formed in loess and in clayey residuum underlain by dolomite bedrock. Permeability is moderate or moderately slow in the loess and slow in the clayey residuum. Slope ranges from 2 to 12 percent.

Typical pedon of NewGlarus silt loam, 2 to 6 percent slopes, approximately 250 feet north and 2,430 feet east of the southwest corner of sec. 27, T. 14 N., R. 3 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; many fine roots; about 5 percent chert gravel; some dark yellowish brown (10YR 4/4) subsoil material in worm channels; neutral; abrupt smooth boundary.

Bt1—8 to 13 inches; dark yellowish brown (10YR 4/4) silt loam; moderate very fine and fine subangular blocky structure; firm; common fine roots; about 5 percent chert gravel; patchy faint brown (10YR 4/3) clay films on faces of peds and in pores and channels; very pale brown (10YR 7/3) silt coatings on faces of some peds; neutral; clear wavy boundary.

Bt2—13 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong very fine angular blocky structure; firm; few fine roots; about 5 percent chert gravel; patchy faint brown (10YR 4/3) clay films on faces of peds and in pores and channels; many faint dark yellowish brown (10YR 3/4) clay films on faces of many peds; very pale brown (10YR 7/3) silt coatings on faces of some peds; slightly acid; gradual wavy boundary.

2Bt3—26 to 30 inches; dark yellowish brown (10YR 3/4) silty clay; strong very fine angular blocky structure; very firm; few fine roots; about 5 percent chert gravel; many faint dark yellowish brown (10YR 3/4) clay films on faces of peds and in pores and channels; very pale brown (10YR 7/3) silt coatings on faces of some peds; slightly acid; clear wavy boundary.

2Bt4—30 to 38 inches; dark brown (10YR 3/3) (65 percent) and yellowish red (5YR 4/6) (35 percent) silty clay; strong very fine angular blocky structure; very firm; few fine roots; about 5 percent chert

gravel; common partially weathered dolomite fragments; many faint very dark grayish brown (10YR 3/2) clay films on faces of peds and in pores and channels; neutral; clear irregular boundary.

2R—38 inches; light yellowish brown (10YR 6/4) dolomite bedrock.

The thickness of the solum and the depth to dolomite range from 20 to 40 inches. The thickness of the loess mantle ranges from 15 to 28 inches. The content of gravel ranges from 0 to 10 percent throughout the subsoil.

The Ap horizon has chroma of 2 or 3. The A horizon, where it occurs, ranges from 3 to 5 inches in thickness. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. It is silt loam or silty clay loam. The 2Bt horizon has hue of 5YR, 7.5YR, or 10YR; value of 3 or 4; and chroma of 2 to 6. It is silty clay or clay.

Newson Series

The Newson series consists of deep, poorly drained and very poorly drained, rapidly permeable soils on outwash plains, on stream terraces, and in basins of glacial lakes. These soils formed dominantly in medium sand outwash or lacustrine deposits. Slope ranges from 0 to 3 percent.

Typical pedon of Newson mucky loamy sand, in an area of Meehan-Newson complex, 0 to 3 percent slopes; approximately 1,050 feet south and 700 feet east of the northwest corner of sec. 5, T. 20 N., R. 4 E.

A1—0 to 3 inches; black (10YR 2/1) mucky loamy sand, very dark gray (10YR 3/1) dry; weak very fine and fine subangular blocky structure; very friable; common very fine, fine, medium, and coarse roots; very strongly acid; clear smooth boundary.

A2—3 to 8 inches; black (10YR 2/1) loamy sand, very dark gray (10YR 3/1) dry; weak medium subangular blocky structure; very friable; few very fine, fine, medium, and coarse roots; extremely acid; abrupt irregular boundary.

Bg—8 to 16 inches; dark grayish brown (10YR 4/2) sand; few fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very friable; few very fine and fine roots; black (10YR 2/1) soil in some root channels; extremely acid; gradual smooth boundary.

BCg—16 to 22 inches; grayish brown (10YR 5/2) sand; few fine prominent strong brown (7.5YR 5/6) and few medium faint dark grayish brown (10YR 4/2) mottles; single grain; loose; black (10YR 2/1) soil in some root channels; extremely acid; gradual smooth boundary.

C—22 to 60 inches; yellowish brown (10YR 5/4) sand; many medium distinct strong brown (7.5YR 4/6) mottles; single grain; loose; very strongly acid.

The thickness of the solum ranges from 20 to 30 inches. The A horizon is 6 to 9 inches thick. It has hue of 10YR, 7.5YR, or 5YR; value of 2 or 3; and chroma of 1 to 3. The B horizon has hue of 10YR, 2.5Y, or 5Y; value of 4 to 6; and chroma of 1 or 2. It is loamy sand or sand. The C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 4. It is loamy sand or sand.

Orion Series

The Orion series consists of deep, somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slope ranges from 0 to 3 percent.

Typical pedon of Orion silt loam, 0 to 3 percent slopes, approximately 380 feet south and 1,400 feet west of the center of sec. 29, T. 15 N., R. 3 E.

A—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak fine and very fine subangular blocky structure; friable; many very fine and fine roots; fine sand grains coating faces of some peds; mildly alkaline; clear smooth boundary.

C—10 to 34 inches; brown (10YR 5/3) silt loam; common fine distinct dark yellowish brown (10YR 4/6) and many coarse faint dark grayish brown (10YR 4/2) mottles; weak thick platy structure parting to weak fine and very fine subangular; friable; many very fine and fine roots; few discontinuous strata of very fine sand less than 1 inch thick; neutral; clear wavy boundary.

Ab1—34 to 40 inches; black (10YR 2/1) silt loam; common medium distinct dark brown (10YR 3/3) mottles; weak medium subangular blocky structure; friable; few very fine roots; brown (10YR 5/3) soil in some pores and channels and coating faces of some peds; mildly alkaline; clear smooth boundary.

Ab2—40 to 53 inches; very dark gray (10YR 3/1) silty clay loam; common fine prominent yellowish red (5YR 4/6) mottles; weak coarse subangular blocky structure; firm; few very fine roots; neutral; gradual smooth boundary.

C—53 to 60 inches; dark gray (10YR 4/1) loamy fine sand; few fine prominent brownish yellow (10YR

6/6) mottles; massive; very friable; few discontinuous strata of sandy loam and loam less than 1 inch thick; mildly alkaline.

The depth to the Ab horizon ranges from 20 to 40 inches. Below a depth of about 40 inches, the content of gravel ranges from 0 to 10 percent.

The A or Ap horizon has value of 4 or 5 and chroma of 2 or 3. The C horizon has value of 4 or 5 and chroma of 2 or 3. It is silt loam stratified with thin layers of very fine sand or silt. The Ab horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. It is silt loam or silty clay loam, but it is stratified with thin layers of coarser textures in some pedons. The C' horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2.

Palms Series

The Palms series consists of deep, very poorly drained soils on stream and lake terraces. These soils formed in organic material underlain by silty or loamy mineral deposits. Permeability is moderately slow to moderately rapid in the organic layer and moderate or moderately slow in the substratum. Slope is 0 to 1 percent.

Typical pedon of Palms muck, 0 to 1 percent slopes, approximately 370 feet north and 950 feet west of the southeast corner of sec. 5, T. 14 N., R. 4 E.

Oa1—0 to 8 inches; black (N 2/0), broken face and rubbed, sapric material; about 5 percent fiber, less than 5 percent rubbed; weak fine subangular blocky structure, friable; many very fine and fine and few medium roots; primarily herbaceous fibers; slightly acid (pH 6.1 in water); clear smooth boundary.

Oa2—8 to 22 inches; black (N 2/0), broken face and rubbed, sapric material; about 5 percent fiber, less than 5 percent rubbed; weak coarse subangular blocky structure; friable; common very fine and fine roots; primarily herbaceous fibers; slightly acid (pH 6.3 in water); clear smooth boundary.

Oa3—22 to 38 inches; black (N 2/0), broken face and rubbed, sapric material; about 5 percent fiber, less than 5 percent rubbed; massive; friable; few very fine and fine roots; slightly acid (pH 6.5 in water); clear smooth boundary.

Cg—38 to 60 inches; dark gray (10YR 4/1) silt loam; massive; firm; moderately alkaline (pH 8.3 in water).

The thickness of the organic layer ranges from 16 to 51 inches. The organic layer has hue of 10YR or 7.5YR or is neutral in hue. It has chroma of 0 to 2. It is mostly sapric material, but thin layers of hemic material less than 5 inches thick are in some pedons. The Cg horizon has hue of 10YR, 2.5Y, or 5Y; value of 3 to 7; and chroma of 1 or 2. It is silt loam, loam, or silty clay loam.

Partridge Series

The Partridge series consists of moderately deep, somewhat poorly drained, rapidly permeable soils on outwash plains and stream terraces and in some nearby upland areas. These soils formed dominantly in sandy outwash or in sandy eolian deposits underlain by sandstone. Slope ranges from 0 to 3 percent.

Typical pedon of Partridge loamy fine sand, 0 to 3 percent slopes, approximately 160 feet south and 460 feet east of the northwest corner of sec. 24, T. 15 N., R. 4 E.

OE—1 inch to 0; leaves, twigs, pine needles, and duff.

A—0 to 3 inches; black (10YR 2/1) loamy fine sand, very dark gray (10YR 3/1) dry; weak very fine and fine granular structure; very friable; many very fine, fine, and medium and few coarse roots; extremely acid; clear smooth boundary.

Bw1—3 to 11 inches; dark grayish brown (10YR 4/2) loamy fine sand; common fine prominent yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; very friable; common very fine, fine, and medium and few coarse roots; very dark grayish brown (10YR 3/2) soil coating faces of some peds; very strongly acid; clear smooth boundary.

Bw2—11 to 16 inches; light olive brown (2.5Y 5/4) fine sand; many fine and medium distinct olive yellow (2.5Y 6/6) and common fine distinct light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; very friable; few very fine and fine roots; very strongly acid; clear wavy boundary.

C—16 to 23 inches; light yellowish brown (2.5Y 6/4) fine sand; many fine and medium distinct olive yellow (2.5Y 6/6) and common fine distinct light brownish gray (2.5Y 6/2) mottles; single grain; loose; few very fine and fine roots; very strongly acid; abrupt smooth boundary.

2R—23 inches; dark yellowish brown (10YR 4/6) and brown (10YR 5/3), platy sandstone.

The thickness of the solum ranges from 14 to 30 inches. The depth to sandstone ranges from 20 to 40 inches. The content of sandstone gravel and channers ranges from 0 to 15 percent.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is 1 to 5 inches thick. The Ap horizon, where it

occurs, has value of 3 or 4 and chroma of 2 or 3. The Bw horizon has hue of 7.5YR, 10YR, or 2.5Y; value of 3 to 5; and chroma of 2 to 6. It is sand, fine sand, loamy sand, or loamy fine sand. The C horizon has hue of 7.5YR, 10YR, or 2.5Y; value of 4 to 7; and chroma of 2 to 8. It is sand or fine sand. Some pedons have a Cr horizon.

Plainbo Series

The Plainbo series consists of moderately deep, excessively drained, rapidly permeable soils on outwash plains and stream terraces and in some nearby upland areas. These soils formed dominantly in sandy outwash or sandy eolian deposits underlain by sandstone. Slope ranges from 1 to 12 percent.

Typical pedon of Plainbo sand, 1 to 6 percent slopes, approximately 800 feet south and 1,170 feet east of the northwest corner of sec. 13, T. 14 N., R. 5 E.

A—0 to 3 inches; black (10YR 2/1) sand, dark grayish brown (10YR 4/2) dry; weak medium and fine subangular blocky structure; very friable; many very fine and fine and common medium and coarse roots; extremely acid; clear smooth boundary.

Bw1—3 to 7 inches; brown (10YR 4/3) sand; weak medium and fine subangular blocky structure; very friable; common very fine, fine, medium, and coarse roots; very strongly acid; clear smooth boundary.

Bw2—7 to 17 inches; strong brown (7.5YR 4/6) sand; weak medium and fine subangular blocky structure; very friable; common very fine, fine, medium, and coarse roots; strongly acid; gradual smooth boundary.

Bw3—17 to 21 inches; brown (7.5YR 4/4) fine sand; weak medium and fine subangular blocky structure; very friable; common very fine, fine, medium, and coarse roots; very strongly acid; clear smooth boundary.

C—21 to 24 inches; yellowish brown (10YR 5/6) fine sand; single grain; loose; few very fine, fine, medium, and coarse roots; strongly acid; clear smooth boundary.

2Cr1—24 to 36 inches; yellowish brown (10YR 5/6 and 5/8), partly consolidated sandstone.

2Cr2—36 to 60 inches; very pale brown (10YR 7/3), partly consolidated sandstone.

The thickness of the solum ranges from 14 to 30 inches, and the depth to sandstone ranges from 20 to 40 inches. The content of sandstone gravel and channers ranges from 0 to 10 percent in the B and C horizons.

The A horizon is 1 to 5 inches thick. It has value of 2 or 3 and chroma of 1 or 2. The Ap horizon, where it occurs, has value of 3 or 4 and chroma of 2 or 3. The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is loamy sand, fine sand, or sand. The C horizon has hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 4 to 6. It is fine sand or sand.

Plainfield Series

The Plainfield series consists of deep, excessively drained, rapidly permeable soils on outwash plains, stream terraces, and uplands and in basins of glacial lakes. These soils formed in sandy outwash or lacustrine deposits. Slope ranges from 1 to 50 percent.

Typical pedon of Plainfield sand, 1 to 6 percent slopes, approximately 650 feet south and 65 feet east of the northwest corner of sec. 26, T. 20 N., R. 4 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) sand, dark grayish brown (10YR 4/2) dry; weak medium and fine subangular blocky structure; very friable; common fine and very fine roots; neutral; abrupt smooth boundary.

Bw1—8 to 16 inches; dark yellowish brown (10YR 4/4) sand; weak medium subangular blocky structure; very friable; common fine and very fine roots; strongly acid; gradual smooth boundary.

Bw2—16 to 22 inches; dark yellowish brown (10YR 4/6) sand; weak medium and coarse subangular blocky structure; very friable; common fine roots; medium acid; gradual wavy boundary.

C1—22 to 43 inches; yellowish brown (10YR 5/4) sand; single grain; loose; few fine roots; slightly acid; gradual wavy boundary.

C2—43 to 52 inches; light yellowish brown (10YR 6/4) sand; single grain; loose; slightly acid; gradual wavy boundary.

C3—52 to 60 inches; yellowish brown (10YR 5/4) sand; single grain; loose; medium acid.

The thickness of the solum ranges from 18 to 34 inches. The content of gravel ranges from 0 to 15 percent throughout the pedon.

The Ap horizon has value of 3 or 4 and chroma of 1 to 3. The A horizon, where it occurs, is 2 to 4 inches thick. It has value of 2 or 3 and chroma of 1 or 2. It is sand or fine sand. The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is typically sand, but in some pedons individual subhorizons are fine sand. The C horizon has value of 5 to 7 and chroma of 4 to 6. It is sand or fine sand.

Poygan Series

The Poygan series consists of deep, poorly drained, slowly permeable soils on stream and lake terraces. These soils formed dominantly in clayey lacustrine deposits. Slope ranges from 0 to 2 percent.

Typical pedon of Poygan silt loam, 0 to 2 percent slopes approximately 50 feet south and 125 feet west of the northeast corner of sec. 5, T. 18 N., R. 2 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry; moderate coarse and medium subangular blocky structure parting to moderate medium and fine granular; friable; many very fine, fine, and medium roots; neutral; abrupt smooth boundary.

Bg—8 to 11 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine prominent strong brown (7.5YR 5/6) and brown (7.5YR 4/2) mottles; moderate very fine angular blocky structure; firm; common very fine and fine roots; some very dark gray (10YR 3/1) soil in worm and root channels and on faces of some peds; mildly alkaline; clear smooth boundary.

BC—11 to 23 inches; reddish brown (5YR 5/4) silty clay; few fine prominent grayish brown (10YR 5/2) and strong brown (7.5YR 5/8) mottles; strong and moderate very fine angular blocky structure; firm; few very fine and fine roots; mildly alkaline; gradual smooth boundary.

C—23 to 60 inches; reddish brown (5YR 4/4) silty clay; many medium prominent grayish brown (10YR 5/2) and few medium prominent yellowish red (5YR 5/8) mottles; massive; very firm; moderately alkaline; strongly effervescent.

The thickness of the solum ranges from 20 to 27 inches. The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3. The Bg horizon has hue of 7.5YR, 10YR, or 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is silty clay or clay. The C horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 3 or 4. It is silty clay, silty clay loam, or clay.

Reedsburg Series

The Reedsburg series consists of deep, somewhat poorly drained soils on uplands. These soils formed in loess and in clayey material weathered from dolomite bedrock. Permeability is moderate in the loess and slow in the clayey residuum. Slope ranges from 2 to 6 percent.

Typical pedon of Reedsburg silt loam, 2 to 6 percent slopes, approximately 680 feet west and 1,215 feet south of the northeast corner of sec. 28, T. 14 N., R. 3 E.

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak medium subangular blocky structure; friable; many very fine, fine, and medium roots; about 5 percent chert gravel; moderately alkaline; abrupt smooth boundary.

Bt1—9 to 14 inches; yellowish brown (10YR 5/4) silt loam; few fine prominent strong brown (7.5YR 4/6) and few fine distinct grayish brown (10YR 5/2) mottles; moderate fine and medium subangular blocky structure; friable; common very fine, fine, and medium roots; patchy faint dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores and channels; about 5 percent chert gravel; slightly acid; clear smooth boundary.

Bt2—14 to 21 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm; common very fine, fine, and medium roots; patchy faint dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores and channels; about 5 percent chert gravel; strongly acid; gradual wavy boundary.

2Bt3—21 to 35 inches; brown (7.5YR 5/4) cherty silty clay; common coarse prominent grayish brown (10YR 5/2) and common fine prominent strong brown (7.5YR 5/8) mottles; strong medium angular blocky structure parting to strong fine angular blocky; very firm; few roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores and channels; about 20 percent chert gravel; very strongly acid; gradual wavy boundary.

2Bt4—35 to 41 inches; strong brown (7.5YR 5/6) cherty clay; common coarse prominent brown (7.5YR 5/2) and common coarse distinct yellowish red (5YR 4/6) mottles; strong coarse prismatic structure parting to strong medium angular blocky; very firm; few roots; common faint strong brown (7.5YR 4/6) clay films on faces of peds and in pores and channels; about 20 percent chert gravel; very strongly acid; gradual wavy boundary.

2Bt5—41 to 60 inches; strong brown (7.5YR 5/6) cherty clay; common fine prominent brown (7.5YR 5/2) and common fine distinct strong brown (7.5YR 5/8) mottles; strong coarse prismatic structure parting to strong medium angular blocky; very firm; few roots; patchy faint strong brown (7.5YR 4/6) clay films on

faces of peds and in pores and channels; about 20 percent angular chert gravel; very strongly acid.

The solum is more than 60 inches thick. The thickness of the loess mantle ranges from 15 to 40 inches. The content of chert gravel ranges from 0 to 15 percent in the loess and from 0 to 35 percent in the clayey residuum. The content of chert cobbles and stones ranges from 0 to 15 percent throughout the pedon.

The Ap or A horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is silt loam or silty clay loam. The 2Bt horizon has hue of 5YR, 2.5YR, or 7.5YR; value of 3 to 5; and chroma of 2 to 8. It is clay, cherty clay, or cherty silty clay.

Roby Series

The Roby series consists of deep, somewhat poorly drained soils on stream and lake terraces. These soils formed in loamy deposits underlain by stratified loamy and sandy outwash deposits. Permeability is moderate in the subsoil and moderately rapid in the substratum. Slope ranges from 0 to 3 percent.

The Roby soils in cultivated areas in Juneau County generally have a slightly darker surface layer than is defined as the range for the series. This difference, however, does not alter the usefulness or behavior of the soils.

Typical pedon of Roby sandy loam, 0 to 3 percent slopes, approximately 500 feet north and 600 feet east of the center of sec. 11, T. 16 N., R. 2 E.

Ap—0 to 9 inches; dark brown (10YR 3/3) sandy loam, brown (10YR 5/3) dry; weak medium and fine subangular blocky structure; very friable; common very fine and fine and few medium and coarse roots; slightly acid; abrupt smooth boundary.

BE—9 to 15 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium and coarse subangular blocky structure; very friable; few very fine and fine roots; slightly acid; clear smooth boundary.

Bt1—15 to 24 inches; dark yellowish brown (10YR 4/4) sandy loam; few medium distinct grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium and fine subangular blocky structure; friable; few very fine and fine roots; common faint brown (10YR 4/3) clay films on faces of peds and in pores; slightly acid; clear smooth boundary.

Bt2—24 to 28 inches; dark yellowish brown (10YR 4/4) sandy loam; many fine distinct yellowish brown (10YR 5/6) and common medium distinct grayish brown (10YR 5/2) mottles; moderate medium and fine subangular blocky structure; friable; few very fine and fine roots; common faint brown (10YR 4/3) clay films on faces of peds and in pores; slightly acid; gradual smooth boundary.

Bt3—28 to 33 inches; brown (10YR 5/3) sandy loam; many coarse prominent strong brown (7.5YR 5/6) and many medium faint grayish brown (10YR 5/2) mottles; weak coarse and medium subangular blocky structure; friable; patchy thin brown (10YR 4/3) clay films on faces of peds; common fine black (10YR 2/1) iron and manganese accumulations; medium acid; gradual wavy boundary.

C—33 to 60 inches; stratified light brownish gray (10YR 6/2) sand and brown (10YR 5/3) sandy loam; common coarse prominent reddish brown (5YR 4/4) and many coarse prominent strong brown (7.5YR 5/8) mottles; single grain and massive; friable and loose; common fine black (10YR 2/1) iron and manganese accumulations; medium acid.

The thickness of the solum ranges from 30 to 48 inches. The Ap horizon has value and chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 2 to 6. It is dominantly sandy loam or fine sandy loam, but in some pedons it is loam. The C horizon has hue of 5YR, 7.5YR, 10YR, or 2.5Y; value of 4 to 6; and chroma of 2 to 8. It is dominantly sandy loam or loam that has strata of sand or loamy sand as much as 5 inches thick.

Rozetta Series

The Rozetta series consists of deep, moderately well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 2 to 20 percent.

Typical pedon of Rozetta silt loam, 6 to 12 percent slopes, eroded, approximately 2,325 feet south and 1,040 feet west of the northeast corner of sec. 7, T. 14 N., R. 4 E.

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam, light brownish gray (10YR 6/2) dry; weak fine and medium subangular blocky structure; friable; common very fine and fine and few medium roots; some brown (10YR 4/3) soil mixed in by plowing; neutral; abrupt smooth boundary.

Bt1—9 to 16 inches; brown (10YR 4/3) silt loam; moderate very fine and fine subangular blocky structure; friable; common very fine and fine roots; common faint brown (10YR 4/3) clay films on faces of peds; very pale brown (10YR 7/3 dry) silt grains

coating faces of some peds and in pores and channels; medium acid; gradual smooth boundary.

Bt2—16 to 24 inches; brown (10YR 5/3) silt loam; strong very fine and fine angular and subangular blocky structure; firm; common very fine and fine roots; patchy faint brown (10YR 4/3) clay films on faces of peds; very pale brown (10YR 7/3 dry) silt grains coating faces of some peds; common black (10YR 2/1) iron and manganese accumulations; strongly acid; gradual wavy boundary.

Bt3—24 to 32 inches; yellowish brown (10YR 5/4) silt loam; weak medium prismatic structure parting to strong medium and fine subangular blocky; friable; few very fine roots; patchy faint dark yellowish brown (10YR 4/4) clay films on faces of peds; very pale brown (10YR 7/3 dry) silt grains coating faces of some peds; common black (10YR 2/1) iron and manganese accumulations; medium acid; gradual wavy boundary.

Bt4—32 to 42 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct brownish yellow (10YR 6/6) mottles; moderate medium and coarse prismatic structure parting to moderate medium and coarse subangular blocky; friable; few very fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; very pale brown (10YR 7/3 dry) silt grains coating faces of some peds; many very fine and fine black (10YR 2/1) iron and manganese accumulations; medium acid; clear wavy boundary.

BC—42 to 50 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct brownish yellow (10YR 6/6) and few medium prominent strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to weak medium and coarse subangular blocky; friable; few very fine roots; thin patchy clay films on faces of some peds; very pale brown (10YR 7/3 dry) silt grains coating faces of some peds; few very fine black (10YR 2/1) iron and manganese accumulations; medium acid; gradual wavy boundary.

C—50 to 60 inches; yellowish brown (10YR 5/4) silt loam; many fine and medium distinct brownish yellow (10YR 6/6), few fine distinct strong brown (7.5YR 5/6), and few fine and medium faint pale brown (10YR 6/3) mottles; massive; friable; very pale brown (10YR 7/3 dry) silt grains coating vertical cracks; few very fine black (10YR 2/1) iron and manganese accumulations; slightly acid.

The thickness of the solum ranges from 42 to more than 60 inches. The Ap horizon has value of 3 to 5 and chroma of 2 or 3. The A horizon, where it occurs, is 2 to 5 inches thick. It has value of 3 or 4 and chroma of 1 or 2. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or silty clay loam. The C horizon has value of 4 or 5 and chroma of 2 to 4.

Urne Series

The Urne series consists of moderately deep, somewhat excessively drained, moderately rapidly permeable soils on uplands. These soils formed in loamy material weathered from the underlying glauconitic sandstone. Slope ranges from 2 to 60 percent.

Typical pedon of Urne very fine sandy loam, 20 to 30 percent slopes, approximately 600 feet north and 2,140 feet east of the southwest corner of sec. 32, T. 14 N., R. 2 E.

A—0 to 4 inches; dark brown (10YR 3/3) very fine sandy loam, grayish brown (10YR 5/2) dry; moderate medium and fine granular structure; very friable; many very fine and fine roots; medium acid; clear smooth boundary.

Bw1—4 to 12 inches; light olive brown (2.5Y 5/4) very fine sandy loam; weak medium and fine subangular blocky structure; very friable; common very fine and fine roots; common grayish green (5G 4/2 and 5/2) sand grains throughout the horizon; some dark brown (10YR 3/3) soil in worm channels and on vertical faces of peds; slightly acid; gradual smooth boundary.

Bw2—12 to 28 inches; dark yellowish brown (10YR 4/4) very fine sandy loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; common grayish green (5G 4/2 and 5/2) sand grains throughout the horizon; about 5 percent sandstone gravel; neutral; clear smooth boundary.

Cr—28 to 60 inches; yellowish brown (10YR 5/4 and 5/6), partly consolidated sandstone that has many grains of grayish green (5G 4/2) glauconite.

The thickness of the solum and the depth to sandstone range from 20 to 40 inches. The content of gravel ranges from 0 to 5 percent in the upper part of the subsoil and 0 to 15 percent in the lower part.

The A horizon is 2 to 4 inches thick. It has value of 2 or 3 and chroma of 1 to 3. The Ap horizon, where it occurs, has value of 3 or 4 and chroma of 2 or 3. The Bw horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is fine sandy loam or very fine sandy loam.

Wautoma Series

The Wautoma series consists of deep, poorly drained and very poorly drained soils on stream and lake terraces. These soils formed in sandy deposits and in the underlying clayey lacustrine deposits. Permeability is moderately rapid or rapid in the sandy upper part of the subsoil and slow or very slow in the clayey lower part and in the substratum. Slope ranges from 0 to 2 percent.

Typical pedon of Wautoma loamy sand, 0 to 2 percent slopes, approximately 80 feet north and 100 feet east of the southwest corner of sec. 31, T. 18 N., R. 2 E.

Ap—0 to 8 inches; black (10YR 2/1) loamy sand, dark gray (10YR 4/1) dry; weak very fine and fine granular structure; very friable; common very fine and fine and few medium roots; slightly acid; abrupt smooth boundary.

Bg1—8 to 27 inches; gray (10YR 5/1) sand; common medium prominent strong brown (7.5YR 5/8) and common medium distinct grayish brown (2.5Y 5/2) mottles; single grain; loose; few very fine and fine roots; few discontinuous strata of sandy loam and loam less than 1 inch thick; slightly acid; clear wavy boundary.

Bg2—27 to 30 inches; gray (5Y 5/1) loam; many medium prominent strong brown (7.5YR 5/8) mottles; weak medium and coarse subangular blocky structure; friable; few very fine roots; strongly acid; clear smooth boundary.

2Bg3—30 to 38 inches; light gray (10YR 6/1) silty clay; many medium prominent strong brown (7.5YR 5/6) and few fine prominent reddish brown (5YR 5/3) mottles; moderate medium and coarse subangular blocky structure; firm; strongly acid; clear smooth boundary.

2C—38 to 60 inches; yellowish red (5YR 5/6) silty clay; many fine prominent light gray (5Y 6/1) and common medium prominent strong brown (7.5YR 5/8) mottles; massive; firm; slightly acid.

The thickness of the solum ranges from 24 to 50 inches. The thickness of the sandy mantle ranges from 20 to 40 inches.

The Ap or A horizon has value of 2 or 3 and chroma of 1 or 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y; value of 4 to 6; and chroma of 1 or 2. It is sand or loamy sand in the upper part and sandy loam or loam in the lower part. The 2Bg horizon has hue of 5YR, 7.5YR, or 10YR; value of 4 to 6; and chroma of 1 to 6. It is silty clay loam, silty clay, or clay. The 2C horizon has colors and textures similar to those of the 2Bg horizon.

Wildale Series

The Wildale series consists of deep, well drained, slowly permeable soils on uplands. These soils formed dominantly in clayey material weathered from dolomite bedrock. Slope ranges from 2 to 12 percent.

Typical pedon of Wildale cherty silt loam, 2 to 6 percent slopes, approximately 650 feet south and 1,970 feet east of the northwest corner of sec. 26, T. 14 N., R. 3 E.

Ap—0 to 9 inches; dark brown (10YR 3/3) cherty silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; friable; common very fine and fine and few medium and coarse roots; about 20 percent chert gravel and cobbles; neutral; abrupt smooth boundary.

2Bt1—9 to 16 inches; dark red (2.5YR 3/6) cherty clay; strong very fine and fine angular blocky structure; very firm; common very fine and fine and few medium and coarse roots; many distinct reddish brown (2.5YR 4/4) clay films on faces of peds; about 20 percent chert fragments; medium acid; gradual smooth boundary.

2Bt2—16 to 43 inches; dark red (2.5YR 3/6) and brown (7.5YR 5/4) clay; strong very fine angular blocky structure; very firm; few very fine and fine roots; many distinct dark reddish brown (2.5YR 3/4) clay films on faces of peds; very strongly acid; gradual smooth boundary.

2Bt3—43 to 60 inches; red (2.5YR 4/6) clay; strong very coarse prismatic structure parting to moderate very fine and fine angular and subangular blocky; very firm; many faint dark red (2.5YR 3/6) clay films on faces of peds; very strongly acid.

The solum is more than 60 inches thick. The thickness of the loess mantle ranges from 5 to 15 inches. The content of chert gravel and cobbles ranges from 0 to 20 percent in the loess and from 0 to 35 percent in the residuum.

The Ap or A horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 to 3. The 2Bt horizon has hue of 2.5YR, 5YR, or 7.5YR; value of 3 to 6; and chroma of 4 to 8. It is silty clay, clay, cherty silty clay, or cherty clay.

Wyeville Series

The Wyeville series consists of deep, somewhat poorly drained soils on stream and lake terraces. These

soils formed in sandy deposits and in the underlying clayey lacustrine deposits. Permeability is moderately rapid in the sandy upper part of the profile and slow or very slow in the clayey lower part. Slope ranges from 0 to 3 percent.

Typical pedon of Wyeville sand, 0 to 3 percent slopes, approximately 2,430 feet north and 100 feet west of the southeast corner of sec. 4, T. 17 N., R. 2 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) sand, gray (10YR 5/1) dry; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; common very fine and fine and few medium roots; medium acid; abrupt smooth boundary.

Bw1—8 to 13 inches; brown (10YR 4/3) sand; common medium faint grayish brown (10YR 5/2) and dark grayish brown (10YR 4/2) and common fine and medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; few very fine and fine roots; medium acid; clear smooth boundary.

Bw2—13 to 17 inches, grayish brown (10YR 5/2) sand; common fine prominent yellowish brown (10YR 5/6) and few fine faint dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; very friable; few very fine roots; medium acid; clear irregular boundary.

Bw3—17 to 25 inches; light brown (7.5YR 6/4) sand; common fine and medium distinct strong brown (7.5YR 5/6), common fine and medium prominent strong brown (7.5YR 5/8), and few fine and medium prominent yellowish red (5YR 5/8) mottles; weak coarse subangular blocky structure; very friable; few very fine roots; medium acid; abrupt smooth boundary.

2Bt1—25 to 32 inches; reddish brown (5YR 4/4) silty clay; common fine distinct yellowish red (5YR 5/6) and common fine prominent pinkish gray (7.5YR 6/2) mottles; strong very fine angular and subangular blocky structure; firm; few very fine roots; many faint reddish brown (5YR 4/3) clay films on faces of peds and in pores and channels; pinkish white (7.5YR 8/2 dry) silt grains coating faces of some peds; black (N 2/0) iron and manganese coatings on faces of some peds; strongly acid; clear wavy boundary.

2Bt2—32 to 40 inches; reddish brown (5YR 4/4) silty clay; common fine distinct yellowish red (5YR 5/6) and common fine prominent pinkish gray (7.5YR 6/2) and light brownish gray (10YR 6/2) mottles; moderate medium and coarse prismatic structure parting to strong very fine and fine angular and subangular blocky; firm; many faint reddish brown (5YR 4/3) clay films on faces of peds and in pores and channels; pinkish white (7.5YR 8/2 dry) silt grains coating faces of some peds; black (N 2/0) iron and manganese coatings on faces of some peds; medium acid; gradual wavy boundary.

2Bt3—40 to 48 inches; reddish brown (5YR 4/4) silty clay; common fine and medium prominent light brownish gray (10YR 6/2), common fine faint reddish brown (5YR 5/3), and common fine distinct yellowish red (5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium and coarse subangular blocky; firm; patchy faint reddish brown (5YR 4/3) clay films on faces of peds and in pores and channels; many faint reddish brown (5YR 4/3) clay films on some vertical faces of prisms; pinkish white (7.5YR 8/2 dry) silt grains coating faces of some peds; medium acid; gradual irregular boundary.

2C—48 to 60 inches; mixed reddish brown (5YR 4/4) and light reddish brown (5YR 6/4) silty clay; common fine and medium prominent light brownish gray (10YR 6/2) and yellowish red (5YR 5/8) and few fine and medium prominent light gray (10YR 6/1) mottles; massive; firm; slightly acid.

The thickness of the solum ranges from 30 to 50 inches. The thickness of the sandy mantle ranges from 20 to 40 inches.

The Ap horizon has hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 1 to 3. The A horizon, where it occurs, is 2 to 5 inches thick. It has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6. It is loamy fine sand, loamy sand, or sand. The 2Bt horizon has hue of 7.5YR or 5YR, value of 4 to 6, and chroma of 3 to 8. It is silty clay loam or silty clay. The 2C horizon has hue of 7.5YR or 5YR and value and chroma of 4 to 6. It is silty clay loam, silty clay, or clay.

Formation of the Soils

The following paragraphs give information about the geology and underlying material in Juneau County and relate the factors and processes of soil formation to the soils in the county.

Geology and Underlying Material

Robert N. Cheetham, geologist, Soil Conservation Service, helped prepare this section.

Juneau County lies entirely in that part of Wisconsin known as the Driftless Area, a region that was not covered by glaciers. Within this region, Juneau County is a part of two distinct physiographic provinces—the Central Plain and the Western Upland.

The northeastern three-fourths of Juneau County is in the Central Plain. It is a dissected landscape of Upper Cambrian sandstone underlain by Precambrian igneous and metamorphic rocks. These Precambrian rocks are buried 400 to 850 feet beneath the Upper Cambrian sandstone with the exception of the Necedah quartzite. This hill at Necedah is an extrusion of Precambrian quartzite surrounded by Upper Cambrian sandstone.

The dissected sandstone landscape of the Central Plain was relatively flat, except for scattered sandstone buttes. During the glacial period runoff from the Western Uplands and meltwater from the glacier, which was just 4 miles east of the present Wisconsin River, covered the dissected sandstone landscape with a temporary but extensive body of water known as Glacial Lake Wisconsin. This lake covered most of the sandstone with more than 6 feet of lacustrine deposits, which range from clay to sand. As the glacier receded to the east and the lake drained away, some of the lacustrine clay was eroded. Much of the clay was covered with sand as the Wisconsin River and its tributaries acquired their present positions. In addition, the severe postglacial climate resulted in erosion and mass wasting of the Upper Cambrian sandstone, water transport and deposition of sand, and a reduction in size of the sandstone buttes.

The southwestern one-fourth of Juneau County is in the Western Upland. It is a dissected plateau in late youth or early maturity with a relief of several hundred feet. It consists of marine deposits which outcrop in some places and represent a complete suite of Upper Cambrian sandstone, shale, and conglomerate. The Upper Cambrian rocks are capped in places by remnants of a more resistant, Ordivician, marine calcitic-dolomite. The rocks of the Western Uplands have a low dip to the southwest, at about 15 feet per mile, and may represent monoclines between essentially flat-lying rock strata. Small-scale faulting may be present.

Factors of Soil Formation

The factors that determine the kind of soil that forms at any given point are composition of the parent material; the climate under which the soil material has accumulated and weathered; the plant and animal life on and in the soil; the relief, or lay of the land; and the length of time the forces of soil formation have acted on the soil material.

Climate and plant and animal life are active factors of soil formation. They alter the accumulated material and bring about the development of genetically related horizons. The effects of climate and plant and animal life are conditioned by relief. The parent material also affects the kind of profile that can be formed and, in extreme cases, determines it almost entirely. Finally, time is needed to change the parent material into a soil. Usually, a long time is required for the development of distinct horizons. The factors of soil formation are so closely interrelated that few generalizations can be made regarding the effect of any one factor unless conditions are specified for the other four.

Parent Material

Parent material is the unweathered material from which a soil forms. It largely determines the chemical and mineralogical composition of the soil.

Even though Juneau County was never scoured by

glaciers, about three-fourths of the county lies in the basin of extinct Glacial Lake Wisconsin in the Wisconsin Central Plain. Most of the soils in this part of the county formed in sandy lake deposits, sandy outwash, or local sandy residuum, which has fewer weatherable minerals than that in other areas of the county. Friendship, Meehan, Newson, and Plainfield soils formed entirely in these sandy deposits.

Along the southwestern edge of the lake basin, a lake terrace that has clayey lacustrine soils has been dissected and reworked by streams. The result is an intermingling of stream-terrace and bottom-land soils with the clayey lacustrine soils of the lake terrace. Soils in this area formed from a number of different parent materials or combinations of parent materials. Curran, Ettrick, and Jackson soils formed dominantly in loess or other silty deposits underlain by sandy deposits. Billett, Lows, and Meridian soils formed dominantly in loamy deposits underlain by sandy deposits. Roby soils formed in loamy deposits underlain by stratified, loamy and sandy outwash deposits. Manawa and Poygan soils formed dominantly in clayey lacustrine deposits. Delton, Wautoma, and Wyeville soils formed in sandy deposits and in the underlying clayey lacustrine deposits. Korobago soils formed in loamy deposits and in the underlying clayey lacustrine deposits.

The soils on bottom land or flood plains formed mostly in alluvial deposits of recent origin. These deposits, ranging from silty to sandy in texture, were laid down by floodwater during periods of stream overflow. Ettrick and Orion soils formed dominantly in recent silty alluvium. Algansee and Glendora soils formed in a thin layer of recent loamy alluvium underlain by fine sand alluvium.

Organic matter is the parent material for a number of soils in the county. It consists mainly of sedges, reeds, and grasses in various stages of decomposition. Dawson soils formed in organic material underlain by sandy outwash or lacustrine deposits. Palms soils formed in organic material underlain by loamy deposits. Loxley soils formed in thick accumulations of organic material. A large percentage of the Dawson and Loxley soils are in depressions within the basin of Glacial Lake Wisconsin in the northwestern part of the county. Palms soils and a small percentage of Dawson and Loxley soils are in depressions along the southwestern edge of the lake basin and in seep areas and depressions in drainageways in the uplands.

Most of the upland soils in the southwestern part of the county formed in loess, in bedrock residuum, or in both. Rozetta soils formed entirely in loess. NewGlarus, Reedsburg, and Wildale soils formed in loess and in clayey material weathered from dolomite bedrock. Gale and La Farge soils formed dominantly in loess and are underlain by sandy or loamy material weathered from sandstone bedrock. Eleva, Elkmound, Hixton Variant, and Urne soils formed in loamy deposits or loamy material weathered from sandstone bedrock. Boone soils formed in sandy material weathered from sandstone bedrock. Partridge and Plainbo soils formed dominantly in sandy outwash or eolian deposits and are underlain by sandstone bedrock.

Climate

Climate directly affects soil formation through the weathering of rocks. It also alters the parent material through the mechanical action of freezing and thawing. It indirectly affects the accumulation of organic matter by supplying energy and a suitable environment for the growth of both plant and animal organisms.

Precipitation and temperature are the chief elements of climate responsible for soil features. These elements determine the amount of water available for percolation and the formation and decomposition of organic matter, the major processes in the formation of soils.

Percolating water from rainfall and snowmelt affects both the solution and hydration of mineral material and organic substances. The movement of this water also controls the distribution of substances throughout the soil.

The soils in Juneau County usually have a frozen layer in winter. This layer restricts the percolation of water. Consequently, the processes of soil formation are very slow or are suspended in winter. The physical action of frost heave also affects profile development. The high temperature in summer increases the evaporation and transpiration of moisture, thus limiting the amount of percolating water available for soil formation. Temperature also affects the growth and decomposition of organic matter. Decomposition is much slower in cooler climates than in warmer ones.

Wind indirectly affects the moisture content of soils by influencing the rate of evaporation. In addition, the wind often blows away fine particles of soil and organic material, thereby eroding the surface layer. These particles are deposited elsewhere as new parent material.

Climate is modified by variations in slope aspect. The soils on south- or west-facing slopes are warmed and dried by the sun and wind more thoroughly than those on north- and east-facing slopes. The soils on the cooler, more humid north- and east-facing slopes generally contain more moisture and are frozen for a longer period.

Plant and Animal Life

Plants and animals play an important role in soil formation. Several processes occur simultaneously, including the capture of energy through photosynthesis, decomposition of plant residue, cation exchange, and the formation of organic and mineral compounds.

Most of the soils in Juneau County formed under forest vegetation. This resulted in a light-colored soil that has a relatively low content of organic matter. Also, because tree roots intercept water at greater depths than grasses, there is more effective leaching. This leaching removes nutrients and allows clay accumulation at greater depths. In addition, there is an abundance of microflora, such as bacteria and fungi, which play important roles in decomposing organic matter and recycling the nutrients.

Animals in the soil, including earthworms, insects, and rodents, mix the soil and contribute additional organic matter, thereby affecting soil structure, porosity, and content of nutrients. Human civilization also has an important effect on soil formation by disturbing natural soil processes. Many soils have been altered by draining, clearing, burning, and cultivating. Repeatedly removing plant cover has accelerated erosion. Overcultivation has often contributed to the loss of organic matter and has reduced the infiltration rate. In some areas overcultivation and the use of heavy equipment have changed the loose, porous surface layer to clods.

Relief

Relief influences soil formation in Juneau County by affecting the amount of precipitation absorbed in the soil, by influencing the erosion rate, and by directing the movement of materials in suspension or solution from one area to another. Generally, the steeper soils have a thinner solum and a less well developed profile than gently sloping soils, which have more water percolating through the profile.

Relief directly affects external and internal drainage in the soils. The hills, valleys, terraces, basins, and plains of Juneau County are the result of wind, rain, running water, and glacial meltwater. Where bedrock controls the topography, the resistance or lack of resistance of the underlying rock has determined the relief. Relief, in turn, influences soil formation by controlling drainage, runoff, and erosion. In many places the relief of a given soil can be correlated closely with the drainage. In Juneau County, Plainfield, Friendship, Meehan, and Newson soils form a drainage sequence. The excessively drained Plainfield soils are on the higher flats and side slopes and are nearly level to very steep. The moderately well drained Friendship soils are on the lower flats and side slopes and are nearly level and gently sloping. The somewhat poorly drained Meehan soils are on still lower flats, in drainageways and depressions, and on foot slopes. They are nearly level and gently sloping. The poorly drained and very poorly drained Newson soils are on the lowest flats and in drainageways and depressions and are nearly level.

Time

Generally, a long time is needed for soil formation. The degree of horizon development depends on the length of time that the soil-forming processes have been active. Some soils, however, form more rapidly than others. The length of time needed for the formation of a particular kind of soil depends on other factors involved.

When a soil begins to form, the characteristics of the soil material and parent material are almost identical and the soil is said to be immature. Algansee and Glendora soils, for example, are considered immature. Few or no genetic differences are evident between their horizons. Generally, a soil is considered mature if it has well defined horizons as a result of soil-forming processes that have been active for thousands of years. Rozetta soils, for example, are considered mature.

Processes of Soil Formation

A combination of basic processes is responsible for soil formation. The four main processes are gains, losses, transfers, and transformations. These processes generally do not act alone, and all soils have at least the potential for all of these processes. Some changes promote horizon differentiation, and others retard or offset horizon differentiation. The nature of the soil at any given point is the net result of all changes.

An example of how these soil-forming processes interact can be seen in the Rozetta soils. The parent material was calcareous loess, and at some point in time the climate became favorable for the growth of plants. Plants and animals contributed to the accumulation of organic matter and organic acids, and they mixed the soil to some extent. These processes accelerated as more and higher forms of organisms grew in the soil and produced more organic residue and acids.

Free lime in the soil material was gradually dissolved and moved downward out of the soil by percolating water. Suspended particles of clay also were

translocated downward in the soil by percolating water. As a result, the developed soil has no free lime and more clay is in the middle part of the subsoil than in other parts of the soil.

While free lime and clay were being moved downward in the soil, organic matter in various stages of decomposition was accumulating on or near the soil surface. Decomposed organic matter gave the surface layer a darker color than it originally had.

Chemical weathering of minerals in the loess along with the accumulation of translocated clay gradually changed the middle part of the soil to silt loam with a high clay content. Oxidized iron gives this layer a brown color.

As a result of these processes, Rozetta soils now have a surface layer of silt loam and a subsoil that is silt loam in the upper part, silt loam with a high clay content in the middle part, and silt loam in the lower part.

Processes that took place in the formation of Rozetta soils were gains of organic matter in the surface layer, loss of clay from the upper part of the soil and subsequent transfer to the middle part of the subsoil, and transformation of iron compounds in the subsoil.

All these processes are active in the soils of Juneau County. The kinds of parent material in Juneau County together with the relief have, to a great extent, determined the kinds of processes that are dominant in the formation of all the soils. These processes are, in turn, largely responsible for the differences and similarities among the soils.

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Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clayey. Clay, silty clay, or sandy clay.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth, soil. The thickness of the soil over bedrock. In this survey the depth classes are *deep*, more than 40 inches; *moderately deep*, 20 to 40 inches; and *shallow*, 10 to 20 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as

flood plains and coastal plains. Synonym: natural erosion.
Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:
O horizon.—An organic layer of fresh and decaying plant residue.
A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.
E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.
B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.
C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.
Cr horizon.—Soft, consolidated bedrock beneath the soil.
R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy. Clay loam, sandy clay loam, loam, very fine sandy loam, fine sandy loam, or sandy loam.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter is expressed as—

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Organic soil. A soil in which the content of organic carbon is 12 to 18 percent or more, depending on the content of mineral material. The organic layer is more than 16 inches thick.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy. Loamy very fine sand, loamy fine sand, loamy sand, loamy coarse sand, very fine sand, fine sand, sand, or coarse sand.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Silty. Silt, silt loam, or silty clay loam.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. The slope classes in this county are—

Nearly level	0 to 2 percent
Gently sloping or undulating	2 to 6 percent
Sloping or rolling	6 to 12 percent
Moderately steep	12 to 20 percent
Steep	20 to 30 percent
Very steep	more than 30 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of

climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tiers. Layers in the control section of organic soils. The organic material is divided into three tiers. The surface tier is the upper 12 inches, the subsurface tier is the next 24 inches, and the bottom tier is the lower 16 inches.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-81 at Mauston, Wisconsin)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	25.8	4.1	15.0	47	-27	0	0.95	0.37	1.43	3	11.1
February----	31.6	8.2	19.9	52	-23	0	1.12	.24	1.80	3	10.7
March-------	42.6	19.3	31.0	71	-14	8	2.13	.92	3.15	5	11.6
April-------	58.8	33.6	46.2	83	14	48	3.33	1.92	4.59	7	1.9
May---------	71.3	43.9	57.6	91	25	262	3.64	1.91	5.16	8	.0
June--------	79.7	53.1	66.4	94	35	492	3.88	2.41	5.20	8	.0
July--------	83.9	57.6	70.8	96	43	645	3.73	2.31	5.00	7	.0
August------	81.7	55.6	68.7	95	37	580	4.39	1.90	6.51	8	.0
September---	73.0	47.1	60.1	91	27	308	3.97	1.55	5.98	7	.0
October-----	62.6	37.5	50.1	83	15	130	2.40	.74	3.74	5	.1
November----	45.7	25.2	35.5	69	-1	6	1.81	.62	2.79	4	3.7
December----	31.3	12.5	21.9	56	-20	0	1.31	.65	1.87	4	12.6
Yearly:											
Average---	57.3	33.1	45.3	---	---	---	---	---	---	---	---
Extreme---	---	---	---	97	-30	---	---	---	---	---	---
Total-----	---	---	---	---	---	2,479	32.66	26.29	38.70	69	51.7

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-81 at Mauston, Wisconsin)

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 2	May 18	May 31
2 years in 10 later than--	Apr. 28	May 13	May 26
5 years in 10 later than--	Apr. 20	May 3	May 17
First freezing temperature in fall:			
1 year in 10 earlier than--	Sept. 16	Sept. 3	Aug. 18
2 years in 10 earlier than--	Sept. 29	Sept. 16	Sept. 1
5 years in 10 earlier than--	Oct. 24	Oct. 11	Sept. 28

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-81 at Mauston, Wisconsin)

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	159	135	110
8 years in 10	167	142	116
5 years in 10	182	156	128
2 years in 10	198	171	140
1 year in 10	208	180	148

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AgA	Algansee-Glendora fine sandy loams, 0 to 3 percent slopes	24,060	4.7
BlB	Billett sandy loam, 1 to 6 percent slopes	1,160	0.2
BlC2	Billett sandy loam, 6 to 12 percent slopes, eroded	790	0.2
BmB	Billett sandy loam, moderately well drained, 1 to 6 percent slopes	4,380	0.9
BpF	Boone-Plainfield-Rock outcrop complex, 12 to 60 percent slopes	4,850	0.9
CuA	Curran silt loam, 0 to 3 percent slopes	7,880	1.5
Dc	Dawson muck, 0 to 1 percent slopes	4,830	0.9
DeB	Delton loamy fine sand, moderately well drained, 1 to 6 percent slopes	1,650	0.3
EeB	Eleva sandy loam, 2 to 6 percent slopes	1,570	0.3
EeC2	Eleva sandy loam, 6 to 12 percent slopes, eroded	980	0.2
EeD2	Eleva sandy loam, 12 to 20 percent slopes, eroded	860	0.2
EkF	Eleva-Boone-Rock outcrop complex, 30 to 60 percent slopes	24,690	4.8
EnB	Elkmound sandy loam, 1 to 6 percent slopes	1,130	0.2
Et	Ettrick silt loam, 0 to 2 percent slopes	11,330	2.2
FrB	Friendship sand, 1 to 6 percent slopes	56,910	11.0
FsB	Friendship loamy sand, loamy substratum, 1 to 6 percent slopes	4,230	0.8
GaB	Gale silt loam, 2 to 6 percent slopes	880	0.2
GaC2	Gale silt loam, 6 to 12 percent slopes, eroded	680	0.1
HvA	Hixton Variant loam, 0 to 3 percent slopes	1,070	0.2
JaB	Jackson silt loam, 2 to 6 percent slopes	6,550	1.3
KyA	Korobago sandy loam, 0 to 3 percent slopes	2,300	0.4
LfB	La Farge silt loam, 2 to 6 percent slopes	3,920	0.8
LfC2	La Farge silt loam, 6 to 12 percent slopes, eroded	16,090	3.1
LfD2	La Farge silt loam, 12 to 20 percent slopes, eroded	13,330	2.6
Lw	Lows loam, 0 to 2 percent slopes	6,500	1.3
Lx	Loxley muck, 0 to 1 percent slopes	2,050	0.4
MaA	Manawa silt loam, 0 to 3 percent slopes	3,750	0.7
MeA	Meehan sand, 0 to 3 percent slopes	3,840	0.7
MnA	Meehan-Newson complex, 0 to 3 percent slopes	93,702	18.1
MrB	Meridian loam, 2 to 6 percent slopes	970	0.2
NaB	NewGlarus silt loam, 2 to 6 percent slopes	770	0.1
NaC2	NewGlarus silt loam, 6 to 12 percent slopes, eroded	330	0.1
Ne	Newson mucky loamy sand, 0 to 2 percent slopes	1,880	0.4
Ns	Newson-Dawson complex, 0 to 2 percent slopes	50,380	9.8
OrA	Orion silt loam, 0 to 3 percent slopes	4,620	0.9
Pa	Palms muck, 0 to 1 percent slopes	1,610	0.3
PbA	Partridge loamy fine sand, 0 to 3 percent slopes	5,710	1.1
Pc	Pits	410	0.1
PdB	Plainbo sand, 1 to 6 percent slopes	13,600	2.6
PdC	Plainbo sand, 6 to 12 percent slopes	5,610	1.1
PfB	Plainfield sand, 1 to 6 percent slopes	27,620	5.4
PfC	Plainfield sand, 6 to 12 percent slopes	6,550	1.3
PfD	Plainfield sand, 12 to 20 percent slopes	490	0.1
Po	Poygan silt loam, 0 to 2 percent slopes	5,240	1.0
Ps	Psammaquents, nearly level	820	0.2
RbB	Reedsburg silt loam, 2 to 6 percent slopes	240	*
RoA	Roby sandy loam, 0 to 3 percent slopes	4,980	1.0
RzB	Rozetta silt loam, 2 to 6 percent slopes	2,430	0.5
RzC2	Rozetta silt loam, 6 to 12 percent slopes, eroded	7,680	1.5
RzD2	Rozetta silt loam, 12 to 20 percent slopes, eroded	1,680	0.3
Ud	Udorthents, nearly level	1,350	0.3
UfB	Urne very fine sandy loam, 2 to 6 percent slopes	1,380	0.3
UfC2	Urne very fine sandy loam, 6 to 12 percent slopes, eroded	1,960	0.4
UfD2	Urne very fine sandy loam, 12 to 20 percent slopes, eroded	6,770	1.3
UfE	Urne very fine sandy loam, 20 to 30 percent slopes	11,760	2.3
UfF	Urne very fine sandy loam, 30 to 60 percent slopes	5,930	1.2
Wa	Wautoma loamy sand, 0 to 2 percent slopes	7,260	1.4
WdB	Wildale cherty silt loam, 2 to 6 percent slopes	1,250	0.2
WdC2	Wildale cherty silt loam, 6 to 12 percent slopes, eroded	910	0.2
WeA	Wyeville sand, 0 to 3 percent slopes	7,700	1.5
	Water	18,900	3.7
	Total	514,752	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
BlB	Billett sandy loam, 1 to 6 percent slopes
BmB	Billett sandy loam, moderately well drained, 1 to 6 percent slopes
CuA	Curran silt loam, 0 to 3 percent slopes (where drained)
DeB	Delton loamy fine sand, moderately well drained, 1 to 6 percent slopes
Et	Ettrick silt loam, 0 to 2 percent slopes (where drained and either protected from flooding or not frequently flooded during the growing season)
GaB	Gale silt loam, 2 to 6 percent slopes
JaB	Jackson silt loam, 2 to 6 percent slopes
KyA	Korobago sandy loam, 0 to 3 percent slopes (where drained)
LfB	La Farge silt loam, 2 to 6 percent slopes
Lw	Lows loam, 0 to 2 percent slopes (where drained and either protected from flooding or not frequently flooded during the growing season)
MaA	Manawa silt loam, 0 to 3 percent slopes (where drained)
MrB	Meridian loam, 2 to 6 percent slopes
NaB	NewGlarus silt loam, 2 to 6 percent slopes
OrA	Orion silt loam, 0 to 3 percent slopes (where drained and either protected from flooding or not frequently flooded during the growing season)
Po	Poygan silt loam, 0 to 2 percent slopes (where drained and either protected from flooding or not frequently flooded during the growing season)
RbB	Reedsburg silt loam, 2 to 6 percent slopes (where drained)
RoA	Roby sandy loam, 0 to 3 percent slopes (where drained)
RzB	Rozetta silt loam, 2 to 6 percent slopes
UfB	Urne very fine sandy loam, 2 to 6 percent slopes
WdB	Wildale cherty silt loam, 2 to 6 percent slopes

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF COMMON FARM CROPS

(Yields in the N columns are for nonirrigated soils; those in the I columns are for irrigated soils. Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability		Corn		Corn silage		Oats		Alfalfa hay		Red clover hay		Soybeans	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			Bu	Bu	Tons	Tons	Bu	Bu	Tons	Tons	Tons	Tons	Bu	Bu
AgA------------- Algansee-Glendora	VIw	---	---	---	---	---	---	---	---	---	---	---	---	---
BlB------------- Billett	IIIs	IIe	90	140	14	20	75	85	4.0	5.5	3.3	---	31	40
BlC2------------ Billett	IIIe	IIIe	80	125	12	18	65	75	3.3	5.0	3.0	---	28	40
BmB------------- Billett	IIIs	IIe	90	140	15	20	75	85	4.0	5.5	3.5	---	31	40
BpF*------------ Boone-Plainfield-Rock outcrop	VIIs	---	---	---	---	---	---	---	---	---	---	---	---	---
CuA------------- Curran	IIw	---	140	---	24	---	80	---	5.5	---	4.5	---	48	---
Dc-------------- Dawson	IVw	IVw	70	130	12	20	60	80	---	---	---	---	23	45
DeB------------- Delton	IIIe	IIe	95	160	16	21	75	85	4.5	6.0	3.0	---	33	45
EeB------------- Eleva	IIIs	IIe	90	135	15	20	75	85	4.0	5.5	3.0	---	32	45
EeC2------------ Eleva	IIIe	IIIe	80	130	13	18	65	75	3.5	5.0	---	---	27	40
EeD2------------ Eleva	IVe	---	70	---	12	---	55	---	3.0	---	---	---	---	---
EkF*------------ Eleva-Boone-Rock outcrop	VIIs	---	---	---	---	---	---	---	---	---	---	---	---	---
EnB------------- Elkmound	IIIe	IIe	75	125	12	20	65	75	3.5	5.0	2.5	---	27	40
Et-------------- Ettrick	IIw	---	140	---	24	---	85	---	5.5	---	4.5	---	48	---
FrB------------- Friendship	IVs	IIIe	55	130	9	20	50	85	2.5	5.5	2.0	---	22	45
FsB------------- Friendship	IIIs	IIIe	55	130	9	20	50	85	3.0	5.5	2.5	---	23	45
GaB------------- Gale	IIe	---	120	---	20	---	80	---	4.5	---	3.5	---	38	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF COMMON FARM CROPS--Continued

Soil name and map symbol	Land capability		Corn		Corn silage		Oats		Alfalfa hay		Red clover hay		Soybeans	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			Bu	Bu	Tons	Tons	Bu	Bu	Tons	Tons	Tons	Tons	Bu	Bu
GaC2------------ Gale	IIIe	---	110	---	18	---	70	---	4.0	---	---	---	32	---
HvA------------- Hixton Variant	IIIw	IIIw	90	140	15	20	75	85	4.0	5.5	3.0	---	32	45
JaB------------- Jackson	IIe	---	140	---	24	---	80	---	5.3	---	4.3	---	45	---
KyA------------- Korobago	IIw	IIw	110	150	18	23	80	90	5.0	6.5	4.5	---	33	45
LfB------------- La Farge	IIe	---	120	---	20	---	80	---	4.5	---	3.5	---	38	---
LfC2------------ La Farge	IIIe	---	110	---	18	---	70	---	4.3	---	---	---	32	---
LfD2------------ La Farge	IVe	---	100	---	17	---	60	---	3.6	---	---	---	---	---
Lw-------------- Lows	IIw	---	115	---	19	---	80	---	4.0	---	4.0	---	40	---
Lx-------------- Loxley	IVw	---	70	---	12	---	60	---	---	---	---	---	---	---
MaA------------- Manawa	IIw	---	110	---	18	---	80	---	5.0	---	4.0	---	34	---
MeA------------- Meehan	IVw	IVe	55	130	9	20	50	80	2.5	5.5	2.5	---	23	45
MnA------------- Meehan-Newson	IVw	IVw	55	130	9	20	50	80	2.5	5.5	2.5	---	23	45
MrB------------- Meridian	IIe	IIe	105	150	18	23	75	85	3.5	5.5	3.0	---	32	45
NaB------------- NewGlarus	IIe	---	120	---	20	---	80	---	4.5	---	3.5	---	38	---
NaC2------------ NewGlarus	IIIe	---	110	---	19	---	70	---	4.3	---	---	---	32	---
Ne-------------- Newson	IVw	IVw	60	130	10	20	55	80	2.5	5.5	2.0	---	23	45
Ns-------------- Newson-Dawson	IVw	IVw	60	130	10	20	55	80	2.5	5.5	2.0	---	23	45
OrA------------- Orion	IIIw	---	140	---	24	---	80	---	5.5	---	5.0	---	42	---
Pa-------------- Palms	IIIw	---	105	---	17	---	65	---	3.0	---	---	---	42	---
PbA------------- Partridge	IVw	IVw	55	130	9	20	45	80	2.0	5.5	2.0	---	22	40

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF COMMON FARM CROPS--Continued

Soil name and map symbol	Land capability		Corn		Corn silage		Oats		Alfalfa hay		Red clover hay		Soybeans	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			Bu	Bu	Tons	Tons	Bu	Bu	Tons	Tons	Tons	Tons	Bu	Bu
Pc*. Pits														
PdB------------- Plainbo	IVs	IIIe	50	130	8	20	45	70	2.0	5.5	2.0	---	20	40
PdC------------- Plainbo	VIs	IVe	---	120	---	18	40	60	1.7	5.0	---	---	---	35
PfB------------- Plainfield	IVs	IIIe	43	130	5	20	42	80	2.3	5.5	---	---	16	45
PfC------------- Plainfield	VIs	IVe	---	120	---	18	---	70	2.0	5.0	---	---	---	40
PfD------------- Plainfield	VIIs	---	---	---	---	---	---	---	---	---	---	---	---	---
Po-------------- Poygan	IIw	---	110	---	18	---	80	---	5.0	---	4.0	---	35	---
Ps. Psammaquents														
RbB------------- Reedsburg	IIe	---	110	---	18	---	80	---	5.0	---	4.5	---	34	---
RoA------------- Roby	IIw	---	105	---	17	---	75	---	4.5	---	4.0	---	35	---
RzB------------- Rozetta	IIe	---	140	---	24	---	80	---	5.1	---	4.1	---	40	---
RzC2------------ Rozetta	IIIe	---	125	---	21	---	70	---	4.9	---	---	---	37	---
RzD2------------ Rozetta	IVe	---	100	---	19	---	55	---	4.3	---	---	---	---	---
Ud. Udorthents														
UfB------------- Urne	IIIs	IIe	90	140	15	22	75	85	4.0	5.5	3.0	---	32	45
UfC2------------ Urne	IIIe	IIIe	80	130	13	18	70	80	3.5	5.0	---	---	28	40
UfD2------------ Urne	IVe	---	70	---	12	---	50	---	3.0	---	---	---	---	---
UfE------------- Urne	VIe	---	---	---	---	---	40	---	2.5	---	---	---	---	---
UfF------------- Urne	VIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
Wa-------------- Wautoma	IIIw	IIIw	90	140	15	20	75	85	4.0	5.5	3.0	---	32	45

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF COMMON FARM CROPS--Continued

Soil name and map symbol	Land capability		Corn		Corn silage		Oats		Alfalfa hay		Red clover hay		Soybeans	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			Bu	Bu	Tons	Tons	Bu	Bu	Tons	Tons	Tons	Tons	Bu	Bu
WdB------------- Wildale	IIe	---	110	---	18	---	80	---	4.5	---	4.0	---	32	---
WdC2------------ Wildale	IIIe	---	100	---	17	---	70	---	4.0	---	---	---	28	---
WeA------------- Wyeville	IIIw	IIIw	90	140	15	20	75	85	4.0	5.5	3.0	---	32	45

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF IRRIGATED VEGETABLE CROPS

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Sweet corn	Irish potatoes	Snap beans	Canning peas
		Tons	Cwt	Lbs	Lbs
BlB, BmB-----------Billett	IIe	7.5	475	8,000	4,000
BlC2---------------Billett	IIIe	7.0	425	7,200	3,600
Dc-----------------Dawson	IVw	7.5	475	8,000	4,000
DeB----------------Delton	IIe	7.5	475	8,000	4,000
EeB----------------Eleva	IIe	7.5	475	8,000	4,000
EeC2---------------Eleva	IIIe	7.0	425	7,200	3,600
EnB----------------Elkmound	IIe	7.0	425	7,200	3,600
FrB----------------Friendship	IIIe	7.5	475	8,000	4,000
FsB----------------Friendship	IIIe	7.5	475	8,000	4,000
HvA----------------Hixton Variant	IIIw	7.5	475	8,000	4,000
KyA----------------Korobago	IIw	7.5	475	8,000	4,000
MeA----------------Meehan	IVe	7.5	475	8,000	4,000
MnA----------------Meehan-Newson	IVw	7.5	475	8,000	4,000
MrB----------------Meridian	IIe	7.5	475	8,000	4,000
Ne-----------------Newson	IVw	7.5	475	8,000	4,000
Ns-----------------Newson-Dawson	IVw	7.5	475	8,000	4,000
PbA----------------Partridge	IVw	7.5	475	8,000	4,000
PdB----------------Plainbo	IIIe	7.5	475	8,000	4,000
PdC----------------Plainbo	IVe	7.0	425	7,200	3,600
PfB----------------Plainfield	IIIe	7.5	475	8,000	4,000

TABLE 7.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF IRRIGATED VEGETABLE CROPS--Continued

Soil name and map symbol	Land capability	Sweet corn	Irish potatoes	Snap beans	Canning peas
		Tons	Cwt	Lbs	Lbs
PfC: Plainfield	IVe	7.0	425	7,200	3,600
UfB: Urne	IIe	7.5	475	8,000	4,000
UfC2: Urne	IIIe	7.0	425	7,200	3,600
Wa: Wautoma	IIIw	7.5	475	8,000	4,000
WeA: Wyeville	IIIw	7.5	475	8,000	4,000

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
AgA**:									
Algansee	4W	Slight	Severe	Slight	Slight	Quaking aspen	60	64	White spruce, eastern white pine.
						Silver maple	78	32	
						Swamp white oak	---	---	
						White ash	---	---	
						Red maple	56	36	
						American sycamore	---	---	
						Green ash	---	---	
Glendora	3W	Slight	Severe	Moderate	Moderate	Silver maple	90	42	Eastern white pine, white spruce, northern white-cedar.
						Red maple	65	40	
						Swamp white oak	---	---	
						Quaking aspen	---	---	
						Black ash	---	---	
						Eastern cottonwood	---	---	
						White ash	65	59	
BlB, BlC2, BmB-- Billett	4A	Slight	Slight	Slight	Slight	Northern red oak	60	51	Red pine, eastern white pine, white spruce, Norway spruce.
						White oak	---	---	
						Black oak	---	---	
						Northern pin oak	---	---	
						Shagbark hickory	---	---	
BpF**:									
Boone	2R	Severe	Severe	Severe	Moderate	Black oak	44	29	Red pine, jack pine.
						Northern red oak	---	---	
						Jack pine	49	65	
Plainfield	8R	Severe	Severe	Severe	Slight	Eastern white pine	58	115	Red pine, eastern white pine, jack pine.
						Red pine	55	88	
						Jack pine	49	65	
						Northern pin oak	48	32	
Rock outcrop.									
CuA-- Curran	2A	Slight	Slight	Slight	Slight	Silver maple	70	25	White spruce, white ash, red maple.
						Red maple	55	35	
						White ash	---	---	
						Quaking aspen	---	---	
DeB-- Delton	4A	Slight	Slight	Slight	Slight	Northern red oak	61	53	Red pine, eastern white pine, white spruce.
						White oak	---	---	
						Jack pine	---	---	
						Eastern white pine	---	---	
						Red pine	51	77	
EeB, EeC2-- Eleva	2D	Slight	Slight	Slight	Moderate	Black oak	45	30	Jack pine, red pine.
						Jack pine	---	---	
						Northern pin oak	---	---	
						Northern red oak	---	---	
EeD2-- Eleva	2R	Moderate	Moderate	Moderate	Moderate	Black oak	45	30	Jack pine, red pine.
						Jack pine	---	---	
						Northern pin oak	---	---	
						Northern red oak	---	---	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
EkF**:									
Eleva	2R	Severe	Severe	Severe	Moderate	Black oak	45	30	Jack pine, red pine.
						Jack pine	---	---	
						Northern pin oak	---	---	
						Northern red oak	---	---	
Boone	2R	Severe	Severe	Severe	Moderate	Black oak	44	29	Red pine, jack pine.
						Northern red oak	---	---	
						Jack pine	49	65	
Rock outcrop.									
EnB Elkmound	2D	Slight	Slight	Moderate	Severe	Northern red oak	46	29	Red pine, jack pine, eastern redcedar.
						Black oak	---	---	
						White oak	---	---	
						Northern pin oak	---	---	
						Quaking aspen	---	---	
Et Ettrick	2W	Slight	Severe	Severe	Severe	Silver maple	74	29	Silver maple, red maple, white ash, green ash, white spruce.
						Green ash	---	---	
						American basswood	---	---	
						Red maple	---	---	
						Northern red oak	---	---	
FrB, FsB Friendship	6S	Slight	Moderate	Moderate	Slight	Jack pine	56	78	Red pine, eastern white pine, jack pine.
						Red pine	52	80	
						Eastern white pine	---	---	
						Northern pin oak	---	---	
GaB, GaC2 Gale	5D	Slight	Slight	Slight	Moderate	Northern red oak	74	72	Red pine, eastern white pine, white spruce.
						Sugar maple	---	---	
						White oak	---	---	
HvA Hixton Variant	3W	Slight	Slight	Slight	Severe	Black oak	60	43	Red pine, eastern white pine, white spruce, Norway spruce.
						Bur oak	---	---	
						White oak	---	---	
						Northern pin oak	---	---	
						Northern red oak	---	---	
						Black cherry	---	---	
						Shagbark hickory	---	---	
JaB Jackson	5A	Slight	Slight	Slight	Slight	Northern red oak	70	66	Red pine, eastern white pine, white spruce, black walnut.
						White ash	---	---	
						White oak	---	---	
						Bur oak	---	---	
						Black walnut	---	---	
KyA Korobago	4D	Slight	Slight	Slight	Moderate	Northern red oak	66	60	Eastern white pine, Norway spruce, white spruce.
						Red maple	77	48	
						Sugar maple	---	---	
						White ash	---	---	
						American basswood	---	---	
						American elm	---	---	
						Black cherry	---	---	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
LfB, LfC2: La Farge	4D	Slight	Slight	Slight	Moderate	Northern red oak	66	60	Eastern white pine, red pine.
						Black oak	---	---	
						White oak	---	---	
						Shagbark hickory	---	---	
						American basswood	---	---	
LfD2: La Farge	4R	Moderate	Moderate	Moderate	Moderate	Northern red oak	66	60	Eastern white pine, red pine.
						Black oak	---	---	
						White oak	---	---	
						Shagbark hickory	---	---	
						American basswood	---	---	
Lw: Lows	2W	Slight	Severe	Severe	Severe	Silver maple	80	34	Silver maple, red maple, green ash, white ash,
						White ash	---	---	
						Green ash	---	---	
						Red maple	---	---	
						White spruce	---	---	
MaA: Manawa	3D	Slight	Severe	Moderate	Severe	Sugar maple	58	37	Red maple, green ash, white ash, white spruce, eastern white pine.
						Northern red oak	59	49	
						White ash	71	67	
						Red maple	---	---	
						American basswood	67	61	
MeA: Meehan	5W	Slight	Moderate	Moderate	Moderate	Jack pine	55	77	Eastern white pine, jack pine, white spruce, balsam fir, red pine, red maple.
						Eastern white pine	62	127	
						Northern pin oak	60	43	
						Red pine	50	75	
						Paper birch	---	---	
						Quaking aspen	---	---	
						Balsam fir	---	---	
						White spruce	---	---	
						Black spruce	---	---	
MnA**:									
Meehan	5W	Slight	Moderate	Moderate	Moderate	Jack pine	55	77	Eastern white pine, jack pine, white spruce, balsam fir, red pine, red maple.
						Eastern white pine	62	127	
						Northern pin oak	60	43	
						Red pine	50	75	
						Paper birch	---	---	
						Quaking aspen	---	---	
						Balsam fir	---	---	
						White spruce	---	---	
						Black spruce	---	---	
Newson	6W	Slight	Severe	Severe	Severe	Jack pine	59	84	Eastern white pine, white spruce.
						Quaking aspen	50	43	
						Paper birch	---	---	
						Eastern white pine	---	---	
MrB: Meridian	4A	Slight	Slight	Slight	Slight	Northern red oak	68	63	Red pine, eastern white pine, white spruce.
						Sugar maple	---	---	
						American basswood	---	---	
						White ash	---	---	
						White oak	---	---	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
NaB, NaC2------- NewGlarus	3D	Slight	Slight	Slight	Moderate	Northern red oak---- Black oak----------- White ash----------- Black walnut---------	57 --- --- ---	46 --- --- ---	Red pine, eastern white pine, white spruce, black walnut.
Ne-------------- Newson	6W	Slight	Severe	Severe	Severe	Jack pine----------- Quaking aspen------- Paper birch--------- Eastern white pine--	59 50 --- ---	84 43 --- ---	Eastern white pine, white spruce.
Ns**: Newson---------	6W	Slight	Severe	Severe	Severe	Jack pine----------- Quaking aspen------- Paper birch--------- Eastern white pine--	59 50 --- ---	84 43 --- ---	Eastern white pine, white spruce.
Dawson.									
OrA------------- Orion	2W	Slight	Moderate	Slight	Slight	Silver maple-------- Red maple----------- White ash-----------	80 --- ---	34 --- ---	White spruce, silver maple, white ash, eastern cottonwood.
Pa-------------- Palms	2W	Slight	Severe	Severe	Severe	Red maple----------- Silver maple-------- White ash----------- Quaking aspen------- Northern white-cedar Tamarack------------ Black ash-----------	55 80 --- --- --- --- ---	35 34 --- --- --- --- ---	
PbA------------- Partridge	6D	Slight	Moderate	Slight	Moderate	Jack pine----------- Northern pin oak---- Quaking aspen------- Eastern white pine-- Paper birch---------	60 53 --- 63 ---	85 36 --- 130 ---	Jack pine, eastern white pine, white spruce, red maple.
PdB, PdC-------- Plainbo	5D	Slight	Moderate	Moderate	Moderate	Jack pine----------- Northern pin oak---- Black oak-----------	55 47 ---	77 32 ---	Jack pine, eastern white pine.
PfB, PfC-------- Plainfield	8S	Slight	Moderate	Moderate	Slight	Eastern white pine-- Red pine------------ Jack pine----------- Northern pin oak----	58 55 49 48	115 88 65 32	Red pine, eastern white pine, jack pine.
PfD------------- Plainfield	8R	Moderate	Moderate	Moderate	Slight	Eastern white pine-- Red pine------------ Jack pine----------- Northern pin oak----	58 55 49 48	115 88 65 32	Red pine, eastern white pine, jack pine.
Po-------------- Poygan	4W	Slight	Severe	Severe	Severe	White ash----------- Red maple----------- Silver maple-------- American elm--------	65 --- --- ---	59 --- --- ---	White spruce, black spruce, red maple, silver maple.

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
RbB------------- Reedsburg	4D	Slight	Slight	Slight	Moderate	Northern red oak---- Black oak----------- White oak-----------	60 --- ---	51 --- ---	Eastern white pine, Norway spruce, white spruce.
RoA------------- Roby	4A	Slight	Slight	Slight	Slight	Northern red oak---- White oak----------- Bur oak------------- Shagbark hickory----	65 --- --- ---	59 --- --- ---	Eastern white pine, northern red oak, red pine, black walnut.
RzB, RzC2-------- Rozetta	4A	Slight	Slight	Slight	Slight	Northern red oak---- White oak----------- Bur oak------------- Shagbark hickory----	65 --- --- ---	59 --- --- ---	Eastern white pine, northern red oak, red pine, black walnut.
RzD2------------ Rozetta	4R	Moderate	Moderate	Moderate	Slight	Northern red oak---- White oak----------- Bur oak------------- Shagbark hickory----	65 --- --- ---	59 --- --- ---	Eastern white pine, northern red oak, red pine, black walnut.
UfB, UfC2------- Urne	4D	Slight	Slight	Slight	Moderate	Northern red oak---- White oak----------- Black oak----------- Shagbark hickory---- White ash-----------	62 --- --- --- ---	54 --- --- --- ---	Red pine, eastern white pine, white spruce.
UfD2, UfE------- Urne	4R	Moderate	Moderate	Moderate	Moderate	Northern red oak---- White oak----------- Black oak----------- Shagbark hickory---- White ash-----------	62 --- --- --- ---	54 --- --- --- ---	Red pine, eastern white pine, white spruce.
UfF------------- Urne	4R	Severe	Severe	Severe	Moderate	Northern red oak---- White oak----------- Black oak----------- Shagbark hickory---- White ash-----------	62 --- --- --- ---	54 --- --- --- ---	Red pine, eastern white pine, white spruce.
Wa-------------- Wautoma	3W	Slight	Severe	Severe	Severe	Red maple----------- Silver maple-------- White ash----------- Green ash-----------	75 --- --- ---	47 --- --- ---	Red maple, silver maple, white ash, green ash.
WdB, WdC2------- Wildale	3D	Slight	Severe	Moderate	Severe	Northern red oak---- Red maple----------- White oak----------- Quaking aspen-------	58 --- --- ---	48 --- --- ---	Red pine, eastern white pine, white spruce, Norway spruce.
WeA------------- Wyeville	3S	Slight	Moderate	Moderate	Moderate	Red maple----------- White ash----------- Jack pine----------- Northern pin oak----	70 --- 62 62	43 --- 89 45	Red maple, silver maple, green ash, white ash.

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
AgA*: Algansee	---	Silky dogwood, Amur privet, Amur maple, lilac, American cranberrybush.	Northern white-cedar.	Green ash, eastern white pine, Norway spruce, red maple, white spruce.	Imperial Carolina poplar.
Glendora.					
BlB, BlC2, BmB: Billett	Manyflower cotoneaster.	Gray dogwood, silky dogwood, Siberian peashrub, American cranberrybush, Amur maple, lilac, eastern redcedar.	Norway spruce	Jack pine, red pine, eastern white pine.	---
BpF*: Boone	Manyflower cotoneaster.	Siberian peashrub, eastern redcedar, lilac, silky dogwood, gray dogwood, Amur maple, American cranberrybush.	Norway spruce	Eastern white pine, red pine, jack pine.	---
Plainfield	Manyflower cotoneaster.	Siberian peashrub, lilac, eastern redcedar, American cranberrybush, silky dogwood, gray dogwood, Amur maple.	Norway spruce	Eastern white pine, red pine, jack pine.	---
Rock outcrop.					
CuA: Curran	---	Nannyberry viburnum, silky dogwood, lilac, American cranberrybush, redosier dogwood, northern white-cedar, common ninebark.	White spruce	Red maple, silver maple, white ash, eastern white pine.	---
Dc. Dawson					

See footnote at end of table.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
DeB-----------------Delton	Manyflower cotoneaster.	Siberian peashrub, eastern redcedar, silky dogwood, lilac, Amur maple, American cranberrybush, gray dogwood.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---
EeB, EeC2, EeD2---Eleva	Manyflower cotoneaster.	Siberian peashrub, eastern redcedar, lilac, American cranberrybush, Amur maple, gray dogwood, silky dogwood.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---
EkF*:					
Eleva------------	Manyflower cotoneaster.	Siberian peashrub, eastern redcedar, lilac, American cranberrybush, Amur maple, gray dogwood, silky dogwood.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---
Boone------------	Manyflower cotoneaster.	Siberian peashrub, eastern redcedar, lilac, silky dogwood, gray dogwood, Amur maple, American cranberrybush.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---
Rock outcrop.					
EnB. Elkmound					
Et-----------------Ettrick	---	Northern white-cedar, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood, common ninebark.	White spruce, balsam fir.	Silver maple, white ash, green ash, red maple.	---
FrB, FsB----------Friendship	Manyflower cotoneaster.	Eastern redcedar, lilac, Amur maple, American cranberrybush, Siberian peashrub, silky dogwood, gray dogwood.	Norway spruce-----	Eastern white pine, red pine, jack pine.	---

See footnote at end of table.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
GaB, GaC2: Gale	Manyflower cotoneaster.	Siberian peashrub, silky dogwood, eastern redcedar, American cranberrybush, Amur maple, lilac, gray dogwood.	Norway spruce	Eastern white pine, red pine, jack pine.	---
HvA: Hixton Variant	---	Northern white-cedar, lilac, American cranberrybush, silky dogwood, redosier dogwood, nannyberry viburnum.	White spruce	Eastern white pine, red pine, white ash, red maple, silver maple.	---
JaB: Jackson	---	Northern white-cedar, lilac, Amur maple, American cranberrybush, gray dogwood.	White spruce, Black Hills spruce, Norway spruce.	Eastern white pine, red pine, white ash, red maple.	---
KyA: Korobago	---	Northern white-cedar, redosier dogwood, silky dogwood, lilac, American cranberrybush, nannyberry viburnum.	Norway spruce, white spruce.	Eastern white pine, red maple, white ash, silver maple.	---
LfB, LfC2, LfD2: La Farge	Manyflower cotoneaster.	Siberian peashrub, eastern redcedar, lilac, American cranberrybush, Amur maple, silky dogwood, gray dogwood.	Norway spruce	Eastern white pine, red pine, jack pine.	---
Lw: Lows	---	Northern white-cedar, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood, common ninebark.	White spruce, balsam fir.	Silver maple, white ash, green ash, red maple.	---
Lx: Loxley	---	Common ninebark, nannyberry viburnum, silky dogwood.	Northern white-cedar.	Siberian crabapple, eastern white pine, green ash.	---

See footnote at end of table.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
MaA: Manawa	---	Alternateleaf dogwood, northern white-cedar, lilac, American cranberrybush, Amur maple, silky dogwood, gray dogwood.	White spruce	Eastern white pine, red pine, white ash, red maple.	---
MeA: Meehan	---	Redosier dogwood, silky dogwood, nannyberry viburnum, American cranberrybush, lilac, northern white-cedar.	White spruce	Red maple, white ash, silver maple, red pine, eastern white pine.	---
MnA*:					
Meehan	---	Redosier dogwood, silky dogwood, nannyberry viburnum, American cranberrybush, lilac, northern white-cedar.	White spruce	Red maple, white ash, silver maple, red pine, eastern white pine.	---
Newson	---	Common ninebark, American cranberrybush, silky dogwood, redosier dogwood, northern white-cedar, nannyberry viburnum.	White spruce, balsam fir.	Silver maple, red maple, green ash, white ash.	---
MrB: Meridian	Manyflower cotoneaster.	Gray dogwood, silky dogwood, Siberian peashrub, American cranberrybush, Amur maple, lilac, eastern redcedar.	Norway spruce	Jack pine, red pine, eastern white pine.	---
NaB, NaC2: NewGlarus	Manyflower cotoneaster.	Eastern redcedar, silky dogwood, Siberian peashrub, lilac, American cranberrybush, Amur maple, gray dogwood.	Norway spruce	Eastern white pine, jack pine, red pine.	---

See footnote at end of table.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
Ne: Newson	---	Common ninebark, American cranberrybush, silky dogwood, redosier dogwood, northern white-cedar, nannyberry viburnum.	White spruce, balsam fir.	Silver maple, red maple, green ash, white ash.	---
Ns*:					
Newson	---	Common ninebark, American cranberrybush, silky dogwood, redosier dogwood, northern white-cedar, nannyberry viburnum.	White spruce, balsam fir.	Silver maple, red maple, green ash, white ash.	---
Dawson.					
OrA: Orion	---	Common ninebark, nannyberry viburnum, northern white-cedar, lilac, American cranberrybush, silky dogwood, redosier dogwood.	White spruce	Eastern white pine, white ash, red maple, silver maple.	---
Pa: Palms	Vanhoutte spirea	Silky dogwood, common ninebark, nannyberry viburnum, American cranberrybush.	Northern white-cedar, Manchurian crabapple, white spruce.	Eastern white pine, Norway spruce, green ash.	Imperial Carolina poplar.
PbA: Partridge	Manyflower cotoneaster.	Amur maple, northern white-cedar, lilac, American cranberrybush, eastern redcedar, gray dogwood.	Norway spruce	Eastern white pine, red pine, silver maple, jack pine.	---
Pc*. Pits					
PdB, PdC: Plainbo	Manyflower cotoneaster.	Eastern redcedar, lilac, Amur maple, American cranberrybush, Siberian peashrub, silky dogwood, gray dogwood.	Norway spruce	Eastern white pine, red pine, jack pine.	---

See footnote at end of table.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
PfB, PfC, PfD: Plainfield	Manyflower cotoneaster.	Siberian peashrub, lilac, eastern redcedar, American cranberrybush, silky dogwood, gray dogwood, Amur maple.	Norway spruce	Eastern white pine, red pine, jack pine.	---
Po: Poygan	---	Northern white-cedar, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood, common ninebark.	White spruce, balsam fir.	Silver maple, green ash, white ash, red maple.	---
Ps. Psammaquents					
RbB: Reedsburg	---	Common ninebark, northern white-cedar, lilac, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood.	White spruce	Eastern white pine, white ash, red maple, silver maple.	---
RoA: Roby	---	Redosier dogwood, nannyberry viburnum, silky dogwood, American cranberrybush, lilac, northern white-cedar.	White spruce	Silver maple, eastern white pine, green ash, white ash, red maple.	---
RzB, RzC2, RzD2: Rozetta	Oriental arborvitae.	Northern white-cedar, Peking cotoneaster, gray dogwood, silky dogwood, lilac, Amur maple.	White spruce	Eastern white pine, red pine, white ash.	---
Ud. Udorthents					
UfB, UfC2, UfD2, UfE, UfF: Urne	Manyflower cotoneaster.	Eastern redcedar, lilac, Amur maple, American cranberrybush, silky dogwood, gray dogwood, Siberian peashrub.	Norway spruce	Eastern white pine, red pine, jack pine.	---

See footnote at end of table.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
Wa: Wautoma	---	Northern white-cedar, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood, common ninebark.	White spruce, balsam fir.	Silver maple, white ash, green ash, red maple.	---
WdB, WdC2: Wildale	---	Alternateleaf dogwood, northern white-cedar, lilac, American cranberrybush, Amur maple, silky dogwood, gray dogwood.	White spruce	Eastern white pine, red pine, white ash, red maple.	---
WeA: Wyeville	---	Northern white-cedar, lilac, American cranberrybush, nannyberry viburnum, silky dogwood, redosier dogwood.	Norway spruce	Eastern white pine, red pine, red maple, silver maple, white ash.	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AgA*:					
Algansee	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
Glendora	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
BlB Billett	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
BlC2 Billett	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
BmB Billett	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
BpF*:					
Boone	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy, slope.	Severe: droughty, slope.
Plainfield	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy, slope.	Severe: droughty, slope.
Rock outcrop.					
CuA Curran	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Dc Dawson	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
DeB Delton	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness, too sandy.	Moderate: wetness, droughty.
EeB Eleva	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty, thin layer, area reclaim.
EeC2 Eleva	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope, thin layer.
EeD2 Eleva	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
EkF*:					
Eleva	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Boone	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy, slope.	Severe: droughty, slope.
Rock outcrop.					
EnB Elkmound	Severe: thin layer, area reclaim.	Severe: thin layer, area reclaim.	Severe: thin layer, area reclaim.	Slight	Severe: thin layer, area reclaim.
Et Ettrick	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
FrB Friendship	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
FsB Friendship	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
GaB Gale	Slight	Slight	Moderate: slope, thin layer, area reclaim.	Slight	Moderate: thin layer, area reclaim.
GaC2 Gale	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer, area reclaim.
HvA Hixton Variant	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding, thin layer.
JaB Jackson	Slight	Slight	Moderate: slope.	Slight	Slight.
KyA Korobago	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
LfB La Farge	Slight	Slight	Moderate: slope, thin layer, area reclaim.	Slight	Moderate: thin layer, area reclaim.
LfC2 La Farge	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer, area reclaim.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LfD2: La Farge	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Lw: Lows	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
Lx: Loxley	Severe: ponding, excess humus, too acid.	Severe: ponding, excess humus, too acid.	Severe: excess humus, ponding, too acid.	Severe: ponding, excess humus.	Severe: too acid, ponding, excess humus.
MaA: Manawa	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
MeA: Meehan	Severe: wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness.	Severe: too sandy.	Moderate: wetness, droughty, too sandy.
MnA*:					
Meehan	Severe: wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness.	Severe: too sandy.	Moderate: wetness, droughty, too sandy.
Newson	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
MrB: Meridian	Slight	Slight	Moderate: slope.	Slight	Slight.
NaB: NewGlarus	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, thin layer, area reclaim.	Slight	Moderate: thin layer, area reclaim.
NaC2: NewGlarus	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer, area reclaim.
Ne: Newson	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
Ns*:					
Newson	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
Dawson	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
OrA: Orion	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Pa: Palms	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
PbA: Partridge	Severe: flooding, wetness.	Moderate: wetness, too sandy.	Severe: wetness.	Moderate: wetness, too sandy.	Moderate: wetness, droughty, flooding.
Pc*. Pits					
PdB: Plainbo	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, thin layer.
PdC: Plainbo	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Moderate: droughty, slope, thin layer.
PfB: Plainfield	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
PfC: Plainfield	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
PfD: Plainfield	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
Po: Poygan	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: flooding, ponding.
Ps. Psammaquents					
RbB: Reedsburg	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: large stones, wetness.
RoA: Roby	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
RzB: Rozetta	Slight	Slight	Moderate: slope.	Slight	Slight.
RzC2: Rozetta	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
RzD2: Rozetta	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Ud. Udorthents					

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
UfB------------------ Urne	Slight---------	Slight---------	Moderate: slope, thin layer, area reclaim.	Slight---------	Moderate: thin layer, area reclaim.
UfC2----------------- Urne	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight---------	Moderate: slope, thin layer, area reclaim.
UfD2----------------- Urne	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
UfE, UfF------------- Urne	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wa------------------- Wautoma	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
WdB------------------ Wildale	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight---------	Moderate: small stones, large stones.
WdC2----------------- Wildale	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight---------	Moderate: small stones, large stones.
WeA------------------ Wyeville	Severe: wetness, percs slowly.	Severe: too sandy, percs slowly.	Severe: too sandy, percs slowly, wetness.	Severe: too sandy.	Moderate: wetness, too sandy.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AgA*:										
Algansee	Very poor.	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair.
Glendora	Very poor.	Very poor.	Fair	Fair	Fair	Good	Good	Very poor.	Fair	Good.
BlB Billett	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BlC2 Billett	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BmB Billett	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BpF*:										
Boone	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Plainfield	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Rock outcrop.										
CuA Curran	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Dc Dawson	Very poor.	Poor	Poor	Poor	Poor	Poor	Good	Poor	Poor	Fair.
DeB Delton	Good	Good	Good	Good	Good	Poor	Fair	Good	Good	Very poor.
EeB, EeC2 Eleva	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
EeD2 Eleva	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
EkF*:										
Eleva	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Boone	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Rock outcrop.										
EnB Elkmound	Fair	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Et Ettrick	Good	Good	Fair	Good	Fair	Good	Good	Good	Good	Good.

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
FrB----------------- Friendship	Poor	Poor	Fair	Fair	Good	Poor	Very poor.	Poor	Good	Very poor.
FsB----------------- Friendship	Fair	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
GaB----------------- Gale	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GaC2---------------- Gale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HvA----------------- Hixton Variant	Fair	Fair	Fair	Good	Good	Fair	Poor	Fair	Good	Poor.
JaB----------------- Jackson	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
KyA----------------- Korobago	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good.
LfB----------------- La Farge	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LfC2---------------- La Farge	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LfD2---------------- La Farge	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Lw------------------ Lows	Fair	Good	Good	Good	Fair	Good	Good	Good	Good	Good.
Lx------------------ Loxley	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
MaA----------------- Manawa	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
MeA----------------- Meehan	Poor	Fair	Good	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
MnA*:										
Meehan-------------	Poor	Fair	Good	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
Newson-------------	Fair	Fair	Fair	Poor	Poor	Good	Good	Fair	Poor	Good.
MrB----------------- Meridian	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NaB, NaC2----------- NewGlarus	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ne------------------ Newson	Fair	Fair	Fair	Poor	Poor	Good	Good	Fair	Poor	Good.
Ns*:										
Newson-------------	Fair	Fair	Fair	Poor	Poor	Good	Good	Fair	Poor	Good.

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ns*:										
Dawson	Very poor.	Poor	Poor	Poor	Poor	Poor	Good	Poor	Poor	Fair.
OrA Orion	Good	Good	Good	Good	Good	Good	Fair	Good	Good	Good.
Pa Palms	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
PbA Partridge	Poor	Fair	Good	Fair	Fair	Fair	Very poor.	Fair	Fair	Poor.
Pc*. Pits										
PdB Plainbo	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
PdC Plainbo	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
PfB Plainfield	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
PfC, PfD Plainfield	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Po Poygan	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good.
Ps. Psammaquents										
RbB Reedsburg	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RoA Roby	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
RzB Rozetta	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
RzC2 Rozetta	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
RzD2 Rozetta	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ud. Udorthents										
UfB, UfC2 Urne	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
UfD2 Urne	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
UfE Urne	Very poor.	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
UfF----------------- Urne	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Wa------------------ Wautoma	Fair	Fair	Good	Good	Good	Good	Good	Fair	Good	Good.
WdB----------------- Wildale	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WdC2---------------- Wildale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WeA----------------- Wyeville	Fair	Fair	Good	Good	Good	Fair	Fair	Fair	Good	Fair.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AgA*:						
Algansee	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
Glendora	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
B1B Billett	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Moderate: droughty.
B1C2 Billett	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: droughty, slope.
BmB Billett	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Slight.
BpF*:						
Boone	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Plainfield	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
CuA Curran	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, frost action.	Moderate: wetness.
Dc Dawson	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
DeB Delton	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
EeB Eleva	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: droughty, thin layer, area reclaim.
EeC2 Eleva	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: droughty, slope, thin layer.
EeD2 Eleva	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
EkF*:						
Eleva	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Boone	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Rock outcrop.						
EnB Elkmound	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: thin layer, area reclaim.
Et Ettrick	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
FrB Friendship	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty, too sandy.
FsB Friendship	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
GaB Gale	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength, frost action.	Moderate: thin layer, area reclaim.
GaC2 Gale	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope, thin layer, area reclaim.
HvA Hixton Variant	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding, thin layer.
JaB Jackson	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
KyA Korobago	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
LfB La Farge	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Moderate: thin layer, area reclaim.
LfC2 La Farge	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope, thin layer, area reclaim.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LfD2: La Farge	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
Lw: Lows	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding, frost action.	Severe: ponding, flooding.
Lx: Loxley	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: too acid, ponding, excess humus.
MaA: Manawa	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
MeA: Meehan	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness, droughty, too sandy.
MnA*:						
Meehan	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness, droughty, too sandy.
Newson	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: ponding.
MrB: Meridian	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
NaB: NewGlarus	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Moderate: thin layer, area reclaim.
NaC2: NewGlarus	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope, thin layer, area reclaim.
Ne: Newson	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: ponding.
Ns*:						
Newson	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: ponding.
Dawson	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
OrA---------------- Orion	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Severe: flooding.
Pa----------------- Palms	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: ponding, frost action, subsides.	Severe: ponding, excess humus.
PbA---------------- Partridge	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, droughty, flooding.
Pc*. Pits						
PdB---------------- Plainbo	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty, thin layer.
PdC---------------- Plainbo	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope, thin layer.
PfB---------------- Plainfield	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty, too sandy.
PfC---------------- Plainfield	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, too sandy.
PfD---------------- Plainfield	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Po----------------- Poygan	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: flooding, ponding.
Ps. Psammaquents						
RbB---------------- Reedsburg	Severe: wetness.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: low strength, frost action.	Moderate: large stones, wetness.
RoA---------------- Roby	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: frost action.	Moderate: wetness, droughty.
RzB---------------- Rozetta	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
RzC2--------------- Rozetta	Moderate: wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
RzD2: Rozetta	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
Ud. Udorthents						
UfB: Urne	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: thin layer, area reclaim.
UfC2: Urne	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, thin layer, area reclaim.
UfD2, UfE, UfF: Urne	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wa: Wautoma	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
WdB: Wildale	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: small stones, large stones.
WdC2: Wildale	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: small stones, large stones.
WeA: Wyeville	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness, droughty, too sandy.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AgA*:					
Algansee	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
Glendora	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
BlB: Billett	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
BlC2: Billett	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
BmB: Billett	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
BpF*:					
Boone	Severe: thin layer, seepage, poor filter.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, seepage, too sandy.
Plainfield	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
Rock outcrop.					
CuA: Curran	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
Dc: Dawson	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
DeB: Delton	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness, too clayey.	Severe: seepage.	Poor: too clayey, hard to pack.
EeB: Eleva	Severe: thin layer, seepage, poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: area reclaim, thin layer.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
EeC2: Eleva	Severe: thin layer, seepage, poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: area reclaim, thin layer.
EeD2: Eleva	Severe: thin layer, seepage, poor filter.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope, thin layer.
EkF*:					
Eleva	Severe: thin layer, seepage, poor filter.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope, thin layer.
Boone	Severe: thin layer, seepage, poor filter.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, seepage, too sandy.
Rock outcrop.					
EnB: Elkmound	Severe: thin layer, seepage.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: area reclaim, thin layer.
Et: Ettrick	Severe: flooding, ponding, percs slowly.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, ponding.	Poor: ponding.
FrB: Friendship	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
FsB: Friendship	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
GaB: Gale	Severe: thin layer, seepage, poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: area reclaim, thin layer.
GaC2: Gale	Severe: thin layer, seepage, poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: area reclaim, thin layer.
HvA: Hixton Variant	Severe: flooding, thin layer, seepage.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: area reclaim, wetness, thin layer.
JaB: Jackson	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
KyA: Korobago	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness, too clayey.	Severe: seepage, wetness.	Poor: too clayey, hard to pack, wetness.
LfB: La Farge	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, thin layer.
LfC2: La Farge	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, thin layer.
LfD2: La Farge	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: area reclaim, slope, thin layer.
Lw: Lows	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, ponding.
Lx: Loxley	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus, too acid.
MaA: Manawa	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
MeA: Meehan	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
MnA*:					
Meehan	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Newson	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, ponding.
MrB: Meridian	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
NaB: NewGlarus	Severe: thin layer, seepage, percs slowly.	Severe: seepage.	Severe: seepage.	Moderate: seepage.	Poor: area reclaim, thin layer.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NaC2: NewGlarus	Severe: thin layer, seepage, percs slowly.	Severe: seepage, slope.	Severe: seepage.	Moderate: seepage, slope.	Poor: area reclaim, thin layer.
Ne: Newson	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, ponding.
Ns*:					
Newson	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, ponding.
Dawson	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
OrA: Orion	Severe: flooding, wetness.	Severe: seepage, wetness, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.
Pa: Palms	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding.	Severe: ponding, seepage.	Poor: ponding.
PbA: Partridge	Severe: flooding, thin layer, seepage.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: area reclaim, seepage, too sandy.
Pc*. Pits					
PdB: Plainbo	Severe: thin layer, seepage, poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: area reclaim, seepage, too sandy.
PdC: Plainbo	Severe: thin layer, seepage, poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: area reclaim, seepage, too sandy.
PfB: Plainfield	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
PfC: Plainfield	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
PfD: Plainfield	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Po: Poygan	Severe: flooding, ponding, percs slowly.	Severe: flooding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
Ps. Psammaquents					
RbB: Reedsburg	Severe: wetness, percs slowly.	Moderate: seepage, slope, large stones.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, small stones.
RoA: Roby	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
RzB: Rozetta	Moderate: wetness.	Moderate: seepage, slope, wetness.	Slight	Slight	Good.
RzC2: Rozetta	Moderate: wetness, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
RzD2: Rozetta	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Ud. Udorthents					
UfB: Urne	Severe: thin layer, seepage.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: area reclaim, thin layer.
UfC2: Urne	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: area reclaim, thin layer.
UfD2, UfE, UfF: Urne	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, slope, thin layer.
Wa: Wautoma	Severe: ponding, percs slowly, poor filter.	Severe: seepage, ponding.	Severe: ponding, too clayey.	Severe: seepage, ponding.	Poor: too clayey, hard to pack, ponding.
WdB: Wildale	Severe: percs slowly.	Moderate: seepage, slope, large stones.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
WdC2: Wildale	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WeA----------------- Wyeville	Severe: wetness, percs slowly.	Severe: seepage.	Severe: wetness, too clayey.	Severe: seepage, wetness.	Poor: too clayey, hard to pack, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AgA*:				
Algansee	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Glendora	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
BlB Billett	Good	Probable	Improbable: too sandy.	Fair: small stones, thin layer.
BlC2 Billett	Good	Probable	Improbable: too sandy.	Fair: small stones, thin layer, slope.
BmB Billett	Good	Probable	Improbable: too sandy.	Fair: small stones, area reclaim, thin layer.
BpF*:				
Boone	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, slope.
Plainfield	Poor: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
Rock outcrop.				
CuA Curran	Fair: wetness.	Probable	Improbable: too sandy.	Good.
Dc Dawson	Poor: wetness.	Probable	Probable	Poor: excess humus, wetness.
DeB Delton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
EeB, EeC2 Eleva	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
EeD2 Eleva	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
ExF*:				
Eleva	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
EkF*:				
Boone	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, slope.
Rock outcrop.				
EnB Elkmound	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, thin layer.
Et Ettrick	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
FrB Friendship	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
FsB Friendship	Good	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
GaB Gale	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
GaC2 Gale	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer, slope.
HvA Hixton Variant	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, thin layer.
JaB Jackson	Fair: wetness.	Probable	Improbable: too sandy.	Good.
KyA Korobago	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
LfB La Farge	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
LfC2 La Farge	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer, slope.
LfD2 La Farge	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Lw Lows	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
Lx Loxley	Poor: wetness, low strength.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness, too acid.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
MaA: Manawa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MeA: Meehan	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
MnA*:				
Meehan	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Newson	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness, too sandy.
MrB: Meridian	Good	Probable	Improbable: too sandy.	Fair: thin layer.
NaB: NewGlarus	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
NaC2: NewGlarus	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer, slope.
Ne: Newson	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness, too sandy.
Ns*:				
Newson	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness, too sandy.
Dawson	Poor: wetness.	Probable	Probable	Poor: excess humus, wetness.
OrA: Orion	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Pa: Palms	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess humus.
PbA: Partridge	Poor: area reclaim.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
Pc*. Pits				
PdB, PdC: Plainbo	Poor: area reclaim.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
PfB, PfC: Plainfield	Good	Probable	Improbable: too sandy.	Poor: too sandy.
PfD: Plainfield	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Po------------------- Poygan	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Ps. Psammaquents				
RbB------------------ Reedsburg	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
RoA------------------ Roby	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
RzB------------------ Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
RzC2----------------- Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
RzD2----------------- Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Ud. Udorthents				
UfB, UfC2------------ Urne	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, thin layer.
UfD2----------------- Urne	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
UfE, UfF------------- Urne	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Wa------------------- Wautoma	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
WdB, WdC2------------ Wildale	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WeA------------------ Wyeville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AgA*:						
Algansee	Severe: seepage.	Severe: seepage, piping, wetness.	Flooding, cutbanks cave.	Wetness, droughty, flooding.	Wetness, too sandy, soil blowing.	Wetness, droughty.
Glendora	Severe: seepage.	Severe: seepage, piping, wetness.	Flooding, cutbanks cave.	Wetness, droughty, soil blowing.	Wetness, too sandy, soil blowing.	Wetness, droughty.
BlB: Billett	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
BlC2: Billett	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
BmB: Billett	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
BpF*:						
Boone	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, area reclaim, too sandy.	Slope, droughty, area reclaim.
Plainfield	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
Rock outcrop.						
CuA: Curran	Severe: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
Dc: Dawson	Severe: seepage.	Severe: excess humus, ponding.	Ponding, subsides, frost action.	Ponding, soil blowing, rooting depth.	Ponding, soil blowing.	Wetness, rooting depth.
DeB: Delton	Severe: seepage.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness, fast intake.	Wetness, soil blowing.	Rooting depth.
EeB: Eleva	Severe: seepage.	Severe: piping.	Deep to water	Slope, droughty, soil blowing.	Area reclaim, soil blowing.	Droughty, area reclaim.
EeC2, EeD2: Eleva	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty, soil blowing.	Slope, area reclaim, soil blowing.	Slope, droughty, area reclaim.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
EkF*:						
Eleva	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty, soil blowing.	Slope, area reclaim, soil blowing.	Slope, droughty, area reclaim.
Boone	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, area reclaim, too sandy.	Slope, droughty, area reclaim.
Rock outcrop.						
EnB Elkmound	Severe: depth to rock, seepage.	Severe: piping, thin layer.	Deep to water	Slope, thin layer.	Depth to rock, area reclaim.	Depth to rock, area reclaim.
Et Ettrick	Severe: seepage.	Severe: ponding.	Flooding, frost action, ponding.	Flooding, ponding.	Ponding	Wetness.
FrB Friendship	Severe: seepage.	Severe: seepage, piping.	Slope, cutbanks cave.	Slope, wetness, droughty.	Wetness, too sandy, soil blowing.	Droughty.
FsB Friendship	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
GaB Gale	Severe: seepage.	Severe: thin layer.	Deep to water	Slope, thin layer, erodes easily.	Area reclaim, erodes easily.	Erodes easily, area reclaim.
GaC2 Gale	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, thin layer, erodes easily.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
HvA Hixton Variant	Severe: seepage.	Severe: piping.	Thin layer, flooding, frost action.	Wetness, thin layer, flooding.	Area reclaim, wetness.	Wetness, area reclaim.
JaB Jackson	Severe: seepage.	Moderate: thin layer, piping, wetness.	Frost action, slope.	Slope, wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
KyA Korobago	Moderate: seepage.	Moderate: hard to pack, wetness.	Percs slowly, frost action.	Wetness, soil blowing, percs slowly.	Erodes easily, wetness, soil blowing.	Wetness, erodes easily, rooting depth.
LfB La Farge	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Slope, thin layer, rooting depth.	Area reclaim, erodes easily.	Erodes easily, area reclaim.
LfC2, LfD2 La Farge	Severe: slope.	Severe: thin layer.	Deep to water	Slope, thin layer, rooting depth.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Lw Lows	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, flooding, frost action.	Ponding, rooting depth, flooding.	Ponding, too sandy.	Wetness, rooting depth.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
Lx----------------- Loxley	Severe: seepage.	Severe: excess humus, ponding.	Ponding, subsides, frost action.	Ponding, soil blowing, too acid.	Ponding, soil blowing.	Wetness.
MaA---------------- Manawa	Slight----------	Severe: hard to pack.	Percs slowly, frost action.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly.	Wetness, rooting depth, percs slowly.
MeA---------------- Meehan	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
MnA*:						
Meehan------------	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
Newson------------	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, flooding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty, rooting depth.
MrB---------------- Meridian	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope-----------	Too sandy------	Favorable.
NaB---------------- NewGlarus	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Slope, thin layer, erodes easily.	Area reclaim, erodes easily.	Erodes easily, area reclaim.
NaC2--------------- NewGlarus	Severe: slope.	Severe: thin layer.	Deep to water	Slope, thin layer, erodes easily.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Ne----------------- Newson	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, flooding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty, rooting depth.
Ns*:						
Newson------------	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, flooding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty, rooting depth.
Dawson------------	Severe: seepage.	Severe: excess humus, ponding.	Ponding, subsides, frost action.	Ponding, soil blowing, rooting depth.	Ponding, soil blowing.	Wetness, rooting depth.
OrA---------------- Orion	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
Pa----------------- Palms	Severe: seepage.	Severe: piping, ponding.	Ponding, subsides, frost action.	Ponding, soil blowing.	Ponding, soil blowing.	Wetness, rooting depth.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
PbA: Partridge	Severe: seepage.	Severe: seepage, piping.	Thin layer, flooding, cutbanks cave.	Wetness, droughty, fast intake.	Area reclaim, wetness, too sandy.	Wetness, droughty, area reclaim.
Pc*. Pits						
PdB: Plainbo	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Area reclaim, too sandy, soil blowing.	Droughty, area reclaim.
PdC: Plainbo	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, area reclaim, too sandy.	Slope, droughty, area reclaim.
PfB: Plainfield	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
PfC, PfD: Plainfield	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
Po: Poygan	Slight	Severe: hard to pack, ponding.	Ponding, percs slowly, flooding.	Ponding, percs slowly, flooding.	Ponding, percs slowly.	Wetness, rooting depth, percs slowly.
Ps. Psammaquents						
RbB: Reedsburg	Moderate: seepage, slope.	Severe: hard to pack.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Large stones, erodes easily, wetness.	Large stones, wetness, percs slowly.
RoA: Roby	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.
RzB: Rozetta	Moderate: seepage, slope.	Slight	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
RzC2, RzD2: Rozetta	Severe: slope.	Slight	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Ud. Udorthents						
UfB: Urne	Severe: seepage.	Severe: piping.	Deep to water	Slope, thin layer, soil blowing.	Area reclaim, erodes easily, soil blowing.	Erodes easily, area reclaim.
UfC2, UfD2, UfE, UfF: Urne	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, thin layer, soil blowing.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
Wa: Wautoma	Severe: seepage.	Severe: ponding.	Ponding, percs slowly.	Ponding, fast intake, soil blowing.	Ponding, soil blowing, percs slowly.	Wetness, rooting depth, percs slowly.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
WdB: Wildale	Moderate: slope.	Severe: hard to pack.	Deep to water	Slope, droughty, percs slowly.	Large stones, percs slowly.	Large stones, percs slowly.
WdC2: Wildale	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, droughty, percs slowly.	Slope, large stones, percs slowly.	Large stones, slope, percs slowly.
WeA: Wyeville	Severe: seepage.	Severe: wetness, hard to pack.	Percs slowly	Wetness, fast intake, soil blowing.	Wetness, soil blowing, percs slowly.	Wetness, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AgA*:											
Algansee	0-5	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-2-4, A-4	0	100	100	60-90	30-65	<25	NP-7
	5-60	Stratified sand to loam.	SM, SP-SM	A-3, A-2-4	0	100	100	50-80	5-35	---	NP
Glendora	0-7	Fine sandy loam	SM, SC, SM-SC	A-4, A-2-4	0-5	95-100	90-100	55-85	25-50	<25	2-10
	7-60	Stratified sand to loamy fine sand.	SP, SM, SP-SM	A-3, A-2-4, A-1-b	0-5	95-100	90-100	45-85	0-35	---	NP
B1B, B1C2 Billett	0-7	Sandy loam	SM, SM-SC, SC	A-2, A-4	0	100	95-100	60-100	25-50	<26	NP-8
	7-23	Sandy loam, fine sandy loam.	SM, SM-SC, SC	A-2, A-4	0-2	90-100	90-100	60-100	25-50	<28	NP-9
	23-33	Sand	SM	A-2, A-4	0-2	75-100	75-100	75-90	20-45	<21	NP-4
	33-60	Sand, fine sand, loamy sand.	SM, SP-SM	A-2, A-4, A-1	0-2	80-100	75-100	40-95	10-40	---	NP
BmB Billett	0-9	Sandy loam	SM, SC, SM-SC	A-4, A-2	0	100	95-100	60-100	25-50	<26	NP-8
	9-34	Fine sandy loam, sandy loam.	SM, SC, SM-SC	A-4, A-2	0-2	90-100	90-100	60-100	25-50	<28	NP-9
	34-60	Fine sand, sand, loamy sand.	SM, SP-SM	A-2, A-4, A-1	0-2	80-100	75-100	40-95	10-40	---	NP
BpF*:											
Boone	0-2	Fine sand	SM, SP-SM	A-2, A-3, A-1	0	75-100	75-100	40-80	5-35	---	NP
	2-33	Fine sand, coarse sand, sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	75-100	75-100	30-75	2-35	---	NP
	33	Weathered bedrock	---	---	---	---	---	---	---	---	---
Plainfield	0-2	Fine sand	SP-SM, SM, SP	A-3, A-2, A-1	0	75-100	75-100	40-80	3-35	---	NP
	2-19	Sand, fine sand	SP, SM, SP-SM	A-3, A-1, A-2	0	75-100	75-100	40-70	1-15	---	NP
	19-60	Sand, fine sand	SP, SM, SP-SM	A-3, A-1, A-2	0	75-100	75-100	40-90	1-15	---	NP
Rock outcrop.											
CuA Curran	0-9	Silt loam	CL	A-4, A-6	0	100	100	95-100	85-95	25-35	8-15
	9-48	Silty clay loam, silt loam.	CL	A-6, A-7, A-4	0	100	100	90-100	85-100	28-50	9-25
	48-53	Stratified silt loam to sand.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	100	100	80-100	35-75	20-30	4-11
	53-60	Sand, fine sand, loamy sand.	SM, SP-SM	A-2, A-3	0	95-100	95-100	50-90	5-35	---	NP

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Dc---------------- Dawson	0-38	Sapric material	PT	A-8	0	---	---	---	---	---	---
	38-60	Sand, fine sand, loamy fine sand.	SM-SC, SM, SC, SP-SM	A-2, A-3, A-1, A-4	0	45-100	35-100	15-90	0-45	<20	NP-10
DeB--------------- Delton	0-10	Loamy fine sand	SM	A-2	0	100	100	50-90	15-35	---	NP
	10-30	Loamy fine sand, fine sand, sand.	SM, SP-SM	A-2, A-3	0	100	100	50-90	5-35	---	NP
	30-36	Sandy loam, loam, fine sandy loam.	SM, SC, CL, ML	A-2, A-4	0	100	100	50-95	30-75	<28	1-9
	36-60	Silty clay loam, silty clay, clay.	CL, CH, MH	A-7	0	100	100	95-100	75-95	40-70	20-40
EeB, EeC2, EeD2-- Eleva	0-9	Sandy loam--------	SM, SM-SC, ML, CL-ML	A-2, A-4	0	90-100	85-100	50-90	25-55	<25	NP-7
	9-21	Sandy loam, fine sandy loam, loam.	CL, SC, ML, SM	A-2, A-4	0-2	90-100	85-100	50-95	25-75	<30	3-9
	21-30	Sand, fine sand, loamy sand.	SM, SP-SM	A-2, A-3, A-1	0-15	90-100	85-100	45-85	5-35	<20	NP-4
	30-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
EkF*:											
Eleva-----------	0-2	Sandy loam--------	SM, SM-SC, ML, CL-ML	A-2, A-4	0	90-100	85-100	50-90	25-55	<25	NP-7
	2-26	Sandy loam, fine sandy loam, loam.	CL, SC, ML, SM	A-2, A-4	0-2	90-100	85-100	50-95	25-75	<30	3-9
	26	Weathered bedrock	---	---	---	---	---	---	---	---	---
Boone-----------	0-2	Fine sand---------	SM, SP-SM	A-2, A-3, A-1	0	75-100	75-100	40-80	5-35	---	NP
	2-25	Fine sand, coarse sand, sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	75-100	75-100	30-75	2-35	---	NP
	25-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
EnB--------------- Elkmound	0-2	Sandy loam--------	SM	A-4, A-2, A-1	0-7	70-100	70-100	45-70	20-40	<21	NP-4
	2-16	Sandy loam, loam	SM, SC, ML, CL	A-2, A-4, A-6, A-1	0-7	70-100	70-100	45-100	20-80	<30	NP-11
	16	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---
Et---------------- Ettrick	0-11	Silt loam---------	CL	A-6, A-7	0	100	100	90-100	70-90	30-50	10-25
	11-44	Silt loam, silty clay loam.	CL, CH	A-7	0	100	100	90-100	85-100	40-55	15-30
	44-60	Stratified silt loam to fine sand.	CL, CL-ML, SC, SM-SC	A-2, A-4, A-6, A-7	0	100	100	60-100	30-100	20-45	4-25
FrB--------------- Friendship	0-2	Sand--------------	SP-SM, SM, SP	A-1, A-3, A-2	0	75-100	75-100	40-70	3-15	---	NP
	2-29	Sand, loamy sand, fine sand.	SP-SM, SM, SP	A-1, A-2, A-3	0	75-100	75-100	40-75	3-30	---	NP
	29-60	Sand--------------	SP-SM, SM, SP	A-1, A-3, A-2	0	75-100	75-100	40-70	3-15	---	NP

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
FsB-------------- Friendship	0-8	Loamy sand-------	SP-SM, SM	A-1, A-2	0	75-100	75-100	40-75	12-30	---	NP
	8-41	Sand, fine sand, loamy sand.	SP-SM, SM, SP	A-1, A-2, A-3	0	75-100	75-100	40-75	3-30	---	NP
	41-60	Sandy loam, loam	SC, SM-SC	A-4, A-2	0-10	90-100	70-100	45-70	25-40	20-30	4-10
GaB, GaC2-------- Gale	0-8	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	90-100	85-95	20-30	5-11
	8-23	Silt loam, silty clay loam.	CL	A-6, A-4, A-7	0	100	100	90-100	85-95	25-45	9-20
	23-27	Sandy loam-------	CL	A-4, A-6	0	100	100	65-100	50-95	25-40	9-20
	27-38	Sand, loamy sand	SM, SP-SM, SM-SC	A-3, A-2, A-1, A-4	0	85-100	85-100	45-75	5-40	<25	NP-7
	38-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
HvA-------------- Hixton Variant	0-4	Loam-------------	CL-ML, CL	A-4	0	100	95-100	70-90	50-70	<25	4-10
	4-21	Loam, sandy loam, fine sandy loam.	CL-ML, CL	A-4	0	100	90-100	70-90	50-70	20-30	4-10
	21-27	Loamy sand, sand, fine sand.	SM, SP-SM	A-2, A-3	0	100	80-100	50-75	5-35	---	NP
	27-60	Unweathered bedrock, weathered bedrock.	---	---	---	---	---	---	---	---	---
JaB-------------- Jackson	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	85-95	25-35	5-15
	9-14	Silt loam--------	CL	A-4, A-6	0	100	100	90-100	85-95	25-35	7-15
	14-45	Silt loam, silty clay loam.	CL	A-6, A-4	0	100	100	90-100	85-100	25-40	7-20
	45-56	Stratified silt loam to sand.	SC, SM-SC, CL, CL-ML	A-4	0	100	100	85-95	35-75	<30	4-10
	56-60	Sand, loamy sand	SP-SM, SM	A-2, A-3	0	95-100	95-100	50-85	5-35	---	NP
KyA-------------- Korobago	0-9	Sandy loam-------	ML, CL-ML, SM, SM-SC	A-4	0	100	100	65-100	35-65	<25	NP-7
	9-29	Sandy loam, loam	ML, CL-ML, CL	A-4	0	100	100	85-100	50-90	<30	NP-9
	29-60	Silty clay loam, clay, silty clay.	CL, CH	A-7	0-5	85-100	85-100	80-100	65-100	40-70	20-40
LfB, LfC2, LfD2-- La Farge	0-8	Silt loam--------	CL, CL-ML	A-4	0	100	100	90-100	85-100	20-30	5-10
	8-30	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	90-100	85-100	25-45	10-25
	30-36	Fine sandy loam, loam, clay loam.	CL, SC	A-6	0	95-100	95-100	85-100	45-65	20-35	10-20
	36-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Lw--------------- Lows	0-9	Loam-------------	ML, CL, CL-ML	A-4	0	100	95-100	85-95	60-75	<25	2-10
	9-28	Loam, silt loam, sandy clay loam.	CL, SC	A-6	0	100	95-100	80-95	35-75	20-35	10-20
	28-60	Sand, loamy sand, fine sand.	SM, SP, SP-SM	A-2, A-3	0	100	95-100	50-90	3-30	---	NP
Lx--------------- Loxley	0-60	Sapric material	PT	A-8	0	---	---	---	---	---	---
MaA-------------- Manawa	0-14	Silt loam--------	ML, CL	A-4, A-6	0	100	100	90-100	70-90	25-35	7-15
	14-47	Silty clay, clay	CH, CL	A-7	0-5	85-100	80-100	80-100	65-95	45-80	25-50
	47-60	Silty clay, silty clay loam, clay.	CH, CL	A-6, A-7	0-5	85-100	80-100	80-100	65-100	30-80	15-50

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
MeA: Meehan	0-7	Sand	SM, SP-SM	A-1, A-3, A-2	0	90-100	75-100	40-90	5-15	---	NP
	7-28	Sand, loamy sand	SM, SP-SM, SP	A-1, A-2, A-3	0	90-100	75-100	40-90	3-30	---	NP
	28-60	Sand	SP, SP-SM	A-1, A-3, A-2	0	90-100	75-100	40-90	0-5	---	NP
MnA*:											
Meehan	0-4	Sand	SM, SP-SM	A-1, A-3, A-2	0	90-100	75-100	40-90	5-15	---	NP
	4-29	Sand, loamy sand	SM, SP-SM, SP	A-1, A-2, A-3	0	90-100	75-100	40-90	3-30	---	NP
	29-60	Sand	SP, SP-SM	A-1, A-3, A-2	0	90-100	75-100	40-90	0-5	---	NP
Newson	0-8	Mucky loamy sand, loamy sand.	SM, SP-SM	A-2, A-1	0	80-100	75-100	40-85	12-35	---	NP
	8-22	Loamy sand, sand	SM, SP-SM, SP	A-2, A-3, A-1	0	80-100	75-100	45-75	3-30	---	NP
	22-60	Sand, loamy sand	SM, SP-SM, SP	A-2, A-3, A-1	0	80-100	75-100	45-75	3-30	---	NP
MrB: Meridian	0-7	Loam	ML, CL, CL-ML	A-4	0	100	100	85-95	60-75	19-30	2-10
	7-23	Loam, sandy clay loam.	CL, SC, SM-SC, CL-ML	A-4, A-6	0	100	100	80-95	35-75	20-35	4-15
	23-39	Sandy loam	SM, SM-SC, SC	A-4, A-2	0	100	100	50-90	15-45	<26	NP-8
	39-60	Sand, loamy sand	SM, SP, SP-SM	A-2, A-3	0	100	100	50-90	0-30	---	NP
NaB, NaC2: NewGlarus	0-8	Silt loam	CL	A-6, A-7	0	100	100	90-100	80-90	25-45	10-25
	8-26	Silty clay loam, silt loam.	CL	A-6, A-7	0	95-100	95-100	90-100	85-95	30-50	10-30
	26-38	Clay, silty clay	CH, CL	A-7	0-10	85-100	85-100	80-100	65-100	45-90	25-60
	38	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ne: Newson	0-7	Mucky loamy sand, loamy sand.	SM, SP-SM	A-2, A-1	0	80-100	75-100	40-85	12-35	---	NP
	7-27	Loamy sand, sand	SM, SP-SM, SP	A-2, A-3, A-1	0	80-100	75-100	45-75	3-30	---	NP
	27-60	Sand, loamy sand	SM, SP-SM, SP	A-2, A-3, A-1	0	80-100	75-100	45-75	3-30	---	NP
Ns*:											
Newson	0-7	Mucky loamy sand	SM, SP-SM	A-2, A-1	0	80-100	75-100	40-85	12-35	---	NP
	7-26	Loamy sand, sand	SM, SP-SM, SP	A-2, A-3, A-1	0	80-100	75-100	45-75	3-30	---	NP
	26-60	Sand, loamy sand	SM, SP-SM, SP	A-2, A-3, A-1	0	80-100	75-100	45-75	3-30	---	NP
Dawson	0-37	Sapric material	PT	A-8	0	---	---	---	---	---	---
	37-60	Sand, loamy fine sand, fine sand.	SM-SC, SM, SC, SP-SM	A-2, A-3, A-1, A-4	0	45-100	35-100	15-90	0-45	<20	NP-10

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
OrA------------- Orion	0-10	Silt loam--------	CL, CL-ML	A-4	0	100	100	85-100	80-100	20-30	4-10
	10-34	Stratified silt loam to very fine sand.	CL, CL-ML	A-4	0	100	100	90-100	70-80	20-30	4-10
	34-53	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	100	100	85-100	85-100	20-40	4-18
	53-60	Stratified silt loam to sand.	CL, CL-ML	A-4	0	80-100	80-100	80-100	80-100	20-30	4-10
Pa-------------- Palms	0-38	Sapric material	PT	A-8	0	---	---	---	---	---	---
	38-60	Loam, silty clay loam, silt loam.	CL-ML, CL, SC, SM-SC	A-4, A-6, A-7, A-2	0	85-100	60-100	35-95	15-90	20-45	5-20
PbA------------- Partridge	0-3	Loamy fine sand	SM	A-2, A-4	0-5	90-100	75-100	65-95	15-50	---	NP
	3-23	Loamy fine sand, fine sand, loamy sand.	SM, SP-SM	A-2, A-1-b, A-4	0-5	90-100	75-100	40-95	12-50	---	NP
	23	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pc*. Pits											
PdB, PdC--------- Plainbo	0-3	Sand-------------	SP-SM, SM	A-2, A-3	0	90-100	85-100	60-70	5-15	---	NP
	3-24	Sand, loamy sand, fine sand.	SP-SM, SM	A-2, A-3	0	90-100	85-100	50-75	5-35	---	NP
	24-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
PfB, PfC, PfD---- Plainfield	0-8	Sand-------------	SP-SM, SM, SP	A-3, A-2, A-1	0	75-100	75-100	40-80	3-35	---	NP
	8-60	Sand, fine sand	SP, SM, SP-SM	A-3, A-1, A-2	0	75-100	75-100	40-90	1-15	---	NP
Po-------------- Poygan	0-8	Silt loam--------	ML, CL	A-4, A-6	0	100	100	90-100	60-90	25-40	3-15
	8-23	Silty clay, clay	CL, CH	A-7	0-5	90-100	80-100	80-100	65-95	45-80	25-45
	23-60	Clay, silty clay, silty clay loam.	CL, CH	A-7	0-5	90-100	85-100	80-100	65-95	40-70	20-45
Ps. Psammaquents											
RbB------------- Reedsburg	0-9	Silt loam--------	CL-ML, CL	A-4, A-6	0-25	75-100	75-100	70-100	55-100	20-40	4-17
	9-21	Silt loam, silty clay loam.	CL	A-6, A-7, A-4	0-25	75-100	75-100	70-100	55-100	25-50	9-25
	21-60	Cherty clay, clay, cherty silty clay.	CH, SC, GC, CL	A-7	0-25	50-100	50-100	45-100	40-100	45-90	25-60
RoA------------- Roby	0-9	Sandy loam-------	SM, SM-SC	A-4	0	95-100	95-100	85-95	35-50	<25	NP-7
	9-33	Fine sandy loam, sandy loam, loam.	SM, ML	A-4, A-2	0	90-100	90-100	85-95	30-75	20-34	NP-7
	33-60	Stratified sand to loam.	SM, SM-SC, SP-SM, ML	A-4, A-2	0	80-100	75-90	50-90	10-65	<20	NP-7
RzB, RzC2, RzD2-- Rozetta	0-9	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	95-100	24-35	8-15
	9-50	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	95-100	35-50	15-30
	50-60	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	85-100	25-40	7-20

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ud. Udorthents											
UfB, UfC2, UfD2, UfE, UfF-------- Urne	0-4	Very fine sandy loam.	SM, ML, CL-ML, SM-SC	A-4	0	90-100	90-100	65-95	35-65	<26	2-7
	4-28	Very fine sandy loam, fine sandy loam.	SM, ML, CL, SC	A-2, A-4, A-1	0	70-100	65-100	40-95	20-65	20-30	3-9
	28-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Wa--------------- Wautoma	0-8	Loamy sand-------	SM	A-2, A-4	0	90-100	90-100	50-90	15-40	---	NP
	8-27	Sand, loamy sand	SM, SP-SM	A-2, A-3, A-4	0	90-100	90-100	50-90	5-40	---	NP
	27-30	Sandy loam, loam	SM, SC, ML, CL	A-2, A-4	0	100	100	55-95	30-75	<25	2-10
	30-60	Silty clay, silty clay loam, clay.	CH, CL	A-7	0	100	100	90-100	85-95	40-55	25-35
WdB, WdC2-------- Wildale	0-9	Cherty silt loam	CL, CL-ML	A-4, A-6	0-25	65-75	65-75	60-75	55-70	25-40	4-17
	9-60	Clay, cherty clay, silty clay.	CH, GC, CL, MH	A-7	0-25	50-100	50-100	45-100	40-100	45-90	25-60
WeA-------------- Wyeville	0-8	Sand-------------	SM, SP-SM	A-2, A-3	0	100	100	50-80	5-35	---	NP
	8-25	Sand, loamy sand, loamy fine sand.	SM, SP-SM	A-3, A-2, A-4	0	100	100	50-100	5-40	---	NP
	25-60	Silty clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	75-100	40-75	20-45

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
AgA*:											
Algansee	0-5	5-15	1.35-1.50	2.0-6.0	0.12-0.14	4.5-7.8	Low	0.24	5	3	1-4
	5-60	0-18	1.40-1.65	6.0-20	0.05-0.10	4.5-8.4	Low	0.17			
Glendora	0-7	8-15	1.20-1.50	2.0-6.0	0.13-0.15	5.6-7.8	Low	0.20	5	3	4-6
	7-60	0-10	1.40-1.65	6.0-20	0.05-0.11	5.6-7.8	Low	0.17			
BlB, BlC2 Billett	0-7	5-15	1.40-1.70	2.0-6.0	0.13-0.18	4.5-7.8	Low	0.20	4	3	1-2
	7-23	6-18	1.40-1.70	2.0-6.0	0.10-0.17	4.5-7.3	Low	0.20			
	23-33	3-18	1.50-1.70	2.0-6.0	0.07-0.14	5.1-7.3	Low	0.20			
	33-60	1-10	1.60-1.70	6.0-20	0.03-0.10	5.1-7.8	Low	0.10			
BmB Billett	0-9	5-15	1.40-1.70	2.0-6.0	0.13-0.18	4.5-7.8	Low	0.20	4	3	1-2
	9-34	6-18	1.40-1.70	2.0-6.0	0.10-0.17	4.5-7.3	Low	0.20			
	34-60	1-5	1.60-1.70	6.0-20	0.03-0.10	5.1-7.8	Low	0.10			
BpF*:											
Boone	0-2	2-3	1.55-1.65	6.0-20	0.07-0.10	5.1-6.5	Low	0.15	4	1	<1
	2-33	0-3	1.55-1.70	6.0-20	0.04-0.11	5.1-7.3	Low	0.15			
	33	---	---	---	---	---	---	---			
Plainfield	0-2	2-5	1.50-1.65	6.0-20	0.04-0.09	5.1-7.3	Low	0.15	5	1	.5-2
	2-19	0-4	1.50-1.65	6.0-20	0.04-0.07	4.5-6.5	Low	0.15			
	19-60	0-4	1.50-1.70	6.0-20	0.03-0.07	4.5-6.5	Low	0.15			
Rock outcrop.											
CuA Curran	0-9	15-22	1.35-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.32	5	5	1-4
	9-48	18-30	1.45-1.65	0.6-2.0	0.18-0.22	5.1-7.3	Moderate	0.43			
	48-53	10-20	1.55-1.65	0.6-2.0	0.06-0.22	5.1-6.5	Low	0.43			
	53-60	1-4	1.55-1.65	6.0-20	0.05-0.10	5.1-6.5	Low	0.15			
Dc Dawson	0-38	---	0.30-1.40	0.2-6.0	0.35-0.45	3.6-4.4	---	---	4	2	65-85
	38-60	0-10	1.55-1.75	6.0-20	0.03-0.10	4.5-6.5	Low	---			
DeB Delton	0-10	4-10	1.55-1.70	2.0-6.0	0.10-0.12	5.1-6.5	Low	0.17	4	2	<1
	10-30	2-10	1.55-1.70	2.0-6.0	0.06-0.11	5.1-6.5	Low	0.17			
	30-36	5-18	1.60-1.70	0.6-6.0	0.12-0.14	5.1-6.5	Low	0.24			
	36-60	35-60	1.65-1.75	<0.2	0.10-0.20	5.1-6.5	Moderate	0.32			
EeB, EeC2, EeD2 Eleva	0-9	5-15	1.40-1.60	2.0-6.0	0.10-0.18	3.6-7.3	Low	0.24	4	3	1-3
	9-21	10-18	1.50-1.60	0.6-6.0	0.09-0.19	3.6-6.5	Low	0.24			
	21-30	1-8	1.50-1.70	2.0-20	0.04-0.10	3.6-6.5	Low	0.15			
	30-60	---	---	---	---	---	---	---			
EkF*:											
Eleva	0-2	5-15	1.40-1.60	2.0-6.0	0.10-0.18	3.6-7.3	Low	0.24	4	3	1-3
	2-26	10-18	1.50-1.60	0.6-6.0	0.09-0.19	3.6-6.5	Low	0.24			
	26	---	---	---	---	---	---	---			
Boone	0-2	2-3	1.55-1.65	6.0-20	0.07-0.10	5.1-6.5	Low	0.15	4	1	<1
	2-25	0-3	1.55-1.70	6.0-20	0.04-0.11	5.1-7.3	Low	0.15			
	25-60	---	---	---	---	---	---	---			
Rock outcrop.											

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
EnB---------------- Elkmound	0-2	5-10	1.20-1.70	0.6-2.0	0.10-0.15	4.5-6.5	Low----------	0.24	2	3	1-2
	2-16	10-20	1.55-1.65	0.6-6.0	0.09-0.20	4.5-6.5	Low----------	0.24			
	16	---	---	---	---	---	-------------	----			
Et----------------- Ettrick	0-11	15-27	1.25-1.35	0.6-2.0	0.22-0.29	6.1-7.8	Low----------	0.28	5	6	4-12
	11-44	20-35	1.30-1.45	0.2-0.6	0.18-0.29	6.1-8.4	Moderate-----	0.28			
	44-60	8-27	1.30-1.50	0.6-6.0	0.20-0.25	6.1-8.4	Low----------	0.28			
FrB---------------- Friendship	0-2	2-6	1.50-1.65	6.0-20	0.06-0.09	5.1-6.5	Low----------	0.15	5	1	.5-2
	2-29	2-7	1.35-1.65	6.0-20	0.05-0.11	5.1-6.5	Low----------	0.15			
	29-60	0-4	1.50-1.70	6.0-20	0.04-0.07	5.6-7.8	Low----------	0.15			
FsB---------------- Friendship	0-8	3-10	1.50-1.65	6.0-20	0.08-0.12	5.1-7.3	Low----------	0.17	5	2	.5-2
	8-41	2-7	1.50-1.65	6.0-20	0.05-0.11	5.1-6.5	Low----------	0.17			
	41-60	10-20	1.60-1.80	0.6-2.0	0.07-0.13	4.5-7.3	Low----------	0.24			
GaB, GaC2--------- Gale	0-8	12-20	1.35-1.45	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	4	5	1-3
	8-23	20-32	1.45-1.55	0.6-2.0	0.18-0.22	4.5-6.5	Moderate-----	0.37			
	23-27	18-30	1.45-1.55	0.6-2.0	0.17-0.22	4.5-6.5	Moderate-----	0.37			
	27-38	1-14	1.30-1.50	6.0-20	0.05-0.14	4.5-6.5	Low----------	0.15			
	38-60	---	---	---	---	---	-------------	----			
HvA---------------- Hixton Variant	0-4	7-15	1.40-1.70	2.0-6.0	0.20-0.22	3.6-7.3	Low----------	0.24	4	5	2-4
	4-21	10-18	1.50-1.70	2.0-6.0	0.12-0.19	3.6-7.3	Low----------	0.24			
	21-27	1-8	1.55-1.70	2.0-20	0.05-0.11	3.6-6.0	Low----------	0.15			
	27-60	---	---	---	---	---	-------------	----			
JaB---------------- Jackson	0-9	15-22	1.35-1.60	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
	9-14	15-27	1.35-1.60	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.37			
	14-45	18-30	1.55-1.65	0.6-2.0	0.18-0.22	5.6-7.3	Moderate-----	0.37			
	45-56	10-20	1.55-1.65	0.6-2.0	0.09-0.22	5.1-6.5	Low----------	0.37			
	56-60	1-4	1.55-1.65	6.0-20	0.05-0.09	5.1-6.5	Low----------	0.15			
KyA---------------- Korobago	0-9	5-15	1.30-1.45	0.6-2.0	0.13-0.15	6.1-7.8	Low----------	0.20	4	3	1-3
	9-29	5-18	1.45-1.55	0.6-2.0	0.17-0.22	6.1-7.8	Low----------	0.37			
	29-60	35-60	1.70-1.80	0.06-0.6	0.07-0.20	6.6-8.4	Moderate-----	0.37			
LfB, LfC2, LfD2-- La Farge	0-8	14-17	1.35-1.55	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	4	5	1-3
	8-30	20-30	1.35-1.75	0.6-2.0	0.18-0.22	4.5-6.5	Moderate-----	0.37			
	30-36	6-30	1.55-1.70	0.6-2.0	0.15-0.19	4.5-6.5	Moderate-----	0.37			
	36-60	---	---	---	---	---	-------------	----			
Lw----------------- Lows	0-9	12-22	1.20-1.55	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.24	4	5	3-5
	9-28	18-27	1.55-1.65	0.6-2.0	0.16-0.19	5.1-6.5	Moderate-----	0.32			
	28-60	2-8	1.75-1.85	6.0-20	0.05-0.11	5.1-6.5	Low----------	0.15			
Lx----------------- Loxley	0-60	---	0.15-0.40	0.2-6.0	0.35-0.45	<4.5	-------------	----	5	2	70-90
MaA---------------- Manawa	0-14	13-27	1.30-1.45	0.6-2.0	0.22-0.24	6.1-7.8	Low----------	0.28	3	5	4-9
	14-47	45-55	1.50-1.60	0.06-0.2	0.09-0.20	5.6-8.4	Moderate-----	0.28			
	47-60	35-60	1.60-1.75	0.06-0.2	0.08-0.20	7.4-8.4	Moderate-----	0.28			
MeA---------------- Meehan	0-7	1-4	1.35-1.65	6.0-20	0.07-0.09	3.6-6.0	Low----------	0.15	5	1	.5-3
	7-28	4-9	1.60-1.70	6.0-20	0.06-0.11	5.1-6.5	Low----------	0.17			
	28-60	1-4	1.60-1.70	6.0-20	0.02-0.07	5.1-6.5	Low----------	0.17			
MnA*:											
Meehan-----------	0-4	1-4	1.35-1.65	6.0-20	0.07-0.09	3.6-6.0	Low----------	0.15	5	1	.5-3
	4-29	4-9	1.60-1.70	6.0-20	0.06-0.11	5.1-6.5	Low----------	0.17			
	29-60	1-4	1.60-1.70	6.0-20	0.02-0.07	5.1-6.5	Low----------	0.17			

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
MnA*:											
Newson----------	0-8	4-12	1.35-1.65	2.0-6.0	0.08-0.13	3.6-6.0	Low----------	0.17	5	2	4-15
	8-22	1-4	1.70-1.80	6.0-20	0.05-0.11	3.6-5.5	Low----------	0.17			
	22-60	1-4	1.70-1.80	6.0-20	0.04-0.11	4.5-6.5	Low----------	0.17			
MrB-------------- Meridian	0-7	8-20	1.35-1.55	0.6-2.0	0.20-0.22	6.1-7.8	Low----------	0.28	4	5	2-3
	7-23	18-22	1.55-1.65	0.6-2.0	0.16-0.19	5.1-6.5	Low----------	0.32			
	23-39	3-15	1.55-1.65	0.6-6.0	0.09-0.14	5.1-6.5	Low----------	0.24			
	39-60	1-6	1.75-1.85	6.0-20	0.05-0.10	5.1-6.5	Low----------	0.15			
NaB, NaC2-------- NewGlarus	0-8	12-27	1.20-1.40	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.37	4	5	1-3
	8-26	20-35	1.25-1.45	0.2-2.0	0.18-0.22	5.6-7.3	Moderate-----	0.37			
	26-38	40-80	1.25-1.55	0.06-0.2	0.09-0.13	5.6-7.3	High---------	0.37			
	38	---	---	---	---	---	-------------	----			
Ne--------------- Newson	0-7	4-12	1.35-1.65	2.0-6.0	0.08-0.13	3.6-6.0	Low----------	0.17	5	2	4-15
	7-27	1-4	1.70-1.80	6.0-20	0.05-0.11	3.6-5.5	Low----------	0.17			
	27-60	1-4	1.70-1.80	6.0-20	0.04-0.11	4.5-6.5	Low----------	0.17			
Ns*:											
Newson----------	0-7	4-12	1.35-1.65	2.0-6.0	0.08-0.13	3.6-6.0	Low----------	0.17	5	2	4-15
	7-26	1-4	1.70-1.80	6.0-20	0.05-0.11	3.6-5.5	Low----------	0.17			
	26-60	1-4	1.70-1.80	6.0-20	0.04-0.11	4.5-6.5	Low----------	0.17			
Dawson----------	0-37	---	0.30-1.40	0.2-6.0	0.35-0.45	3.6-4.4	-------------	----	4	2	65-85
	37-60	0-10	1.55-1.75	6.0-20	0.03-0.10	4.5-6.5	Low----------	----			
OrA-------------- Orion	0-10	10-18	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.37	5	5	1-3
	10-34	10-18	1.20-1.30	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
	34-53	10-30	1.25-1.45	0.6-2.0	0.18-0.22	5.6-7.8	Low----------	0.37			
	53-60	10-18	1.20-1.40	0.6-2.0	0.18-0.22	5.6-7.8	Low----------	0.37			
Pa--------------- Palms	0-38	---	0.30-0.55	0.2-6.0	0.35-0.45	5.1-7.8	-------------	----	5	2	>75
	38-60	7-35	1.45-1.75	0.2-2.0	0.14-0.22	6.1-8.4	Low----------	----			
PbA-------------- Partridge	0-3	5-12	1.25-1.45	6.0-20	0.08-0.12	3.6-5.5	Low----------	0.17	4	2	<1
	3-23	2-10	1.50-1.60	6.0-20	0.05-0.11	4.5-6.5	Low----------	0.17			
	23	---	---	---	---	---	-------------	----			
Pc*. Pits											
PdB, PdC--------- Plainbo	0-3	4-9	1.35-1.65	6.0-20	0.07-0.09	3.6-6.5	Low----------	0.15	4	1	<1
	3-24	1-10	1.50-1.65	6.0-20	0.06-0.11	3.6-6.5	Low----------	0.15			
	24-60	---	---	---	---	---	-------------	----			
PfB, PfC, PfD---- Plainfield	0-8	2-5	1.50-1.65	6.0-20	0.04-0.09	5.1-7.3	Low----------	0.15	5	1	.5-2
	8-60	0-4	1.50-1.70	6.0-20	0.03-0.07	4.5-6.5	Low----------	0.15			
Po--------------- Poygan	0-8	15-27	1.30-1.45	0.6-2.0	0.20-0.24	6.1-7.8	Low----------	0.28	3	5	4-10
	8-23	35-60	1.65-1.75	0.06-0.2	0.09-0.18	6.1-7.8	High---------	0.28			
	23-60	35-60	1.65-1.75	0.06-0.2	0.08-0.20	7.4-8.4	High---------	0.28			
Ps. Psammaquents											
RbB-------------- Reedsburg	0-9	10-20	1.25-1.40	0.6-2.0	0.20-0.24	5.6-8.4	Low----------	0.32	4	5	2-3
	9-21	18-35	1.30-1.45	0.6-2.0	0.16-0.22	4.5-6.5	Moderate-----	0.43			
	21-60	40-80	1.25-1.55	0.06-0.2	0.04-0.11	4.5-6.0	High---------	0.28			

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
RoA----------------	0-9	5-15	1.20-1.40	0.6-2.0	0.12-0.15	4.5-6.5	Low-----------	0.20	5	3	1-2
Roby	9-33	10-18	1.40-1.70	0.6-2.0	0.12-0.19	5.6-7.8	Low-----------	0.28			
	33-60	3-15	1.50-1.85	2.0-6.0	0.04-0.17	5.6-7.8	Low-----------	0.10			
RzB, RzC2, RzD2--	0-9	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low-----------	0.37	5	6	1-3
Rozetta	9-50	27-35	1.35-1.55	0.6-2.0	0.18-0.22	4.5-6.0	Moderate------	0.37			
	50-60	20-27	1.40-1.60	0.6-2.0	0.20-0.22	5.6-7.8	Low-----------	0.37			
Ud. Udorthents											
UfB, UfC2, UfD2, UfE, UfF---------	0-4	7-15	1.35-1.65	2.0-6.0	0.15-0.22	5.1-7.8	Low-----------	0.37	4	3	.5-1
Urne	4-28	10-18	1.55-1.65	2.0-6.0	0.09-0.19	5.1-7.8	Low-----------	0.37			
	28-60	---	---	---	---	---	-------------	----			
Wa----------------	0-8	4-10	1.35-1.65	2.0-20	0.10-0.12	5.1-6.5	Low-----------	0.17	4	2	4-8
Wautoma	8-27	2-10	1.45-1.65	2.0-20	0.06-0.11	5.1-6.5	Low-----------	0.17			
	27-30	5-18	1.40-1.70	0.6-6.0	0.12-0.19	5.1-6.5	Low-----------	0.24			
	30-60	35-55	1.65-1.75	<0.2	0.08-0.20	5.1-7.3	Moderate------	0.32			
WdB, WdC2---------	0-9	10-20	1.25-1.40	0.6-2.0	0.15-0.17	5.6-7.3	Low-----------	0.24	3	8	2-3
Wildale	9-60	40-80	1.25-1.55	0.06-0.2	0.04-0.11	3.6-6.0	High----------	0.28			
WeA---------------	0-8	2-8	1.55-1.70	2.0-6.0	0.07-0.09	5.6-7.3	Low-----------	0.15	4	1	<1
Wyeville	8-25	2-10	1.55-1.70	2.0-6.0	0.06-0.11	5.1-7.3	Low-----------	0.17			
	25-60	35-55	1.65-1.75	<0.2	0.10-0.20	5.1-7.3	Moderate------	0.32			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Total subsidence	Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness			Uncoated steel	Concrete
					Ft			In		In			
AgA*:													
Algansee--------	B	Frequent----	Long------	Nov-May	1.0-2.0	Apparent	Nov-May	>60	---	---	Moderate	Low------	Low.
Glendora--------	A/D	Frequent----	Long------	Jan-Dec	0-1.0	Apparent	Nov-Jun	>60	---	---	Moderate	High-----	Moderate.
BlB, BlC2-------- Billett	B	None--------	---	---	>6.0	---	---	>60	---	---	Moderate	Low------	Moderate.
BmB------------- Billett	B	None--------	---	---	3.0-6.0	Apparent	Nov-Apr	>60	---	---	Moderate	Low------	Moderate.
BpF*:													
Boone-----------	A	None--------	---	---	>6.0	---	---	20-40	Soft	---	Low------	Low------	Moderate.
Plainfield------	A	None--------	---	---	>6.0	---	---	>60	---	---	Low------	Low------	High.
Rock outcrop.													
CuA------------- Curran	C	Rare--------	---	---	1.0-3.0	Apparent	Sep-Apr	>60	---	---	High-----	High-----	High.
Dc-------------- Dawson	A/D	None--------	---	---	+1-1.0	Apparent	Sep-Jun	>60	---	30-36	High-----	High-----	High.
DeB------------- Delton	B	None--------	---	---	1.5-3.5	Perched	Nov-May	>60	---	---	Low------	High-----	Moderate.
EeB, EeC2, EeD2- Eleva	B	None--------	---	---	>6.0	---	---	20-40	Soft	---	Moderate	Low------	Moderate.
EkF*:													
Eleva-----------	B	None--------	---	---	>6.0	---	---	20-40	Soft	---	Moderate	Low------	Moderate.
Boone-----------	A	None--------	---	---	>6.0	---	---	20-40	Soft	---	Low------	Low------	Moderate.
Rock outcrop.													
EnB------------- Elkmound	D	None--------	---	---	>6.0	---	---	10-20	Hard	---	Moderate	Low------	Moderate.
Et-------------- Ettrick	B/D	Frequent----	Brief to long.	Nov-May	+1-1.0	Apparent	Nov-Jun	>60	---	---	High-----	High-----	Low.
FrB------------- Friendship	A	None--------	---	---	2.5-6.0	Apparent	Nov-May	>60	---	---	Low------	Low------	High.

See footnote at end of table.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Total subsi-dence	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In			
FsB------------- Friendship	A	None--------	---	---	3.0-6.0	Perched	Nov-May	>60	---	---	Low------	Low------	High.
GaB, GaC2------- Gale	B	None--------	---	---	>6.0	---	---	20-40	Soft	---	High-----	Moderate	Moderate.
HvA------------- Hixton Variant	B	Occasional	Very brief	Nov-May	1.0-3.0	Perched	Nov-May	20-40	Soft	---	High-----	Moderate	High.
JaB------------- Jackson	B	None--------	---	---	2.5-6.0	Apparent	Nov-Apr	>60	---	---	High-----	Moderate	Moderate.
KyA------------- Korobago	C	None--------	---	---	1.0-3.0	Perched	Nov-Jun	>60	---	---	High-----	High-----	Low.
LfB, LfC2, LfD2- La Farge	B	None--------	---	---	>6.0	---	---	24-40	Soft	---	High-----	Moderate	Moderate.
Lw-------------- Lows	B/D	Frequent----	Brief-----	Nov-May	+1-1.0	Apparent	Nov-May	>60	---	---	High-----	High-----	Moderate.
Lx-------------- Loxley	A/D	None--------	---	---	+1-1.0	Apparent	Nov-May	>60	---	50-55	High-----	High-----	High.
MaA------------- Manawa	C	None--------	---	---	1.0-3.0	Perched	Nov-Jun	>60	---	---	High-----	High-----	Low.
MeA------------- Meehan	B	None--------	---	---	1.0-3.0	Apparent	Oct-May	>60	---	---	Moderate	Low------	Moderate.
MnA*:													
Meehan---------	B	None--------	---	---	1.0-3.0	Apparent	Oct-May	>60	---	---	Moderate	Low------	Moderate.
Newson---------	A/D	Frequent----	Brief-----	Apr-Jun	+1-1.0	Apparent	Nov-Jun	>60	---	---	Moderate	Low------	High.
MrB------------- Meridian	B	None--------	---	---	>6.0	---	---	>60	---	---	Moderate	Low------	Moderate.
NaB, NaC2------- NewGlarus	B	None--------	---	---	>6.0	---	---	20-40	Soft	---	High-----	Moderate	Moderate.
Ne-------------- Newson	A/D	Frequent----	Brief-----	Apr-Jun	+1-1.0	Apparent	Nov-Jun	>60	---	---	Moderate	Low------	High.
Ns*:													
Newson---------	A/D	Frequent----	Brief-----	Apr-Jun	+1-1.0	Apparent	Nov-Jun	>60	---	---	Moderate	Low------	High.
Dawson---------	A/D	None--------	---	---	+1-1.0	Apparent	Sep-Jun	>60	---	30-36	High-----	High-----	High.

See footnote at end of table.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Total subsidence	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In			
OrA------------- Orion	C	Frequent----	Brief-----	Mar-Nov	1.0-3.0	Apparent	Nov-May	>60	---	---	High-----	High-----	Low.
Pa-------------- Palms	A/D	None--------	---	---	+1-1.0	Apparent	Nov-May	>60	---	25-32	High-----	High-----	Moderate.
PbA------------- Partridge	B	Occasional	Brief-----	Mar-May	1.0-3.0	Perched	Nov-Jun	20-40	Soft	---	Moderate	Low------	High.
Pc*. Pits													
PdB, PdC-------- Plainbo	A	None--------	---	---	>6.0	---	---	20-40	Soft	---	Low------	Low------	Moderate.
PfB, PfC, PfD--- Plainfield	A	None--------	---	---	>6.0	---	---	>60	---	---	Low------	Low------	High.
Po-------------- Poygan	D	Frequent----	Long------	Nov-Jun	+1-1.0	Perched	Nov-Jul	>60	---	---	High-----	High-----	Low.
Ps. Psammaquents													
RbB------------- Reedsburg	C	None--------	---	---	1.0-3.0	Perched	Nov-May	>60	---	---	High-----	High-----	High.
RoA------------- Roby	C	Rare--------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	---	High-----	Moderate	High.
RzB, RzC2, RzD2- Rozetta	B	None--------	---	---	4.0-6.0	Perched	Mar-Jun	>60	---	---	High-----	Moderate	Moderate.
Ud. Udorthents													
UfB, UfC2, UfD2, UfE, UfF------- Urne	B	None--------	---	---	>6.0	---	---	20-40	Soft	---	Moderate	Low------	Moderate.
Wa-------------- Wautoma	B/D	None--------	---	---	+1-1.0	Apparent	Nov-May	>60	---	---	Moderate	Moderate	Moderate.
WdB, WdC2------- Wildale	C	None--------	---	---	>6.0	---	---	>60	---	---	Moderate	Moderate	High.
WeA------------- Wyeville	C	None--------	---	---	1.0-3.0	Apparent	Nov-Apr	>60	---	---	Moderate	Moderate	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 19.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; UN, Unified; and NP, nonplastic)

Soil name and location	Parent material	Report number	Depth	Moisture density		Percentage passing sieve*--				Percentage smaller than*--				LL	PI	Classification	
				MAX	OPT	No. 4	No. 10	No. 40	No. 200	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHTO	UN
			In	Lb/cf	Pct									Pct			
Billett sandy loam: About 1,320 feet north and 150 feet west of the center of sec. 24, T. 16 N., R. 2 E.	Loamy deposits underlain by sandy deposits.	S84WI-057-4-1	25-34	---	---	100	100	90	38	37	29	17	14	---	NP	A-4(1)	SM
Curran silt loam: About 650 feet south and 1,240 feet west of the center of sec. 28, T. 15 N., R. 3 E.	Dominantly loess or other silty deposits underlain by sandy deposits.	S84WI-057-3-1	15-26	---	---	100	100	99	97	93	66	36	30	46.7	22.5	A-7-6 (14)	CL
Delton loamy fine sand: About 700 feet east and 450 feet north of the center of sec. 23, T. 15 N., R. 4 E.	Sandy deposits and the underlying clayey lacustrine deposits.	S83WI-057-1-1	41-58	---	---	100	100	99	92	90	84	70	58	62.8	31.3	A-7-5 (20)	MH
		1-2	48-60	90.6	26.0	100	100	99	94	93	89	76	58	54.0	27.2	A-7-6 (18)	CH
Eleva sandy loam: About 2,000 feet north and 20 feet east of the southwest corner of sec. 8, T. 14 N., R. 5 E.	Loamy deposits or loamy residuum weathered from the underlying sandstone bedrock.	S82WI-057-20-1	14-21	---	---	96	95	88	42	39	28	14	11	18.5	3.5	A-4(1)	SM

See footnote at end of table.

TABLE 19.--ENGINEERING INDEX TEST DATA--Continued

Soil name and location	Parent material	Report number	Depth	Moisture density		Percentage passing sieve*--				Percentage smaller than*--				LL	PI	Classification	
				MAX	OPT	No. 4	No. 10	No. 40	No. 200	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHTO	UN
			In	Lb/cf	Pct									Pct			
Ettrick silt loam: About 75 feet north and 2,440 feet east of the center of sec. 2, T. 14 N., R. 3 E.	Silty alluvium over sandy deposits.	S83WI-057-3-1	17-26	---	---	100	100	100	98	94	66	32	25	43.3	20.6	A-7-6 (13)	CL
		3-2	44-55	---	---	100	100	99	70	62	36	16	13	23.8	5.0	A-4(7)	CL-ML
Jackson silt loam: About 960 feet north and 1,260 feet west of the center of sec. 28, T. 15 N., R. 3 E.	Dominantly loess or other silty deposits underlain by sandy deposits.	S84WI-057-2-1	22-38	---	---	100	100	100	97	94	62	33	26	38.6	14.3	A-6(10)	CL
La Farge silt loam: About 1,850 feet south and 120 feet west of the northeast corner of sec. 23, T. 14 N., R. 4 E.	Dominantly loess underlain by glauconitic sandstone bedrock.	S82WI-057-21-1	12-22	---	---	100	100	100	97	93	59	32	26	44.1	21.6	A-7-6 (13)	CL
Manawa silt loam: About 1,800 feet north and 120 feet east of the southwest corner of sec. 29, T. 15 N., R. 4 E.	Dominantly clayey lacustrine deposits.	S84WI-057-5-1	18-32	---	---	100	100	99	93	93	93	76	55	51.4	26.2	A-7-6 (17)	CH
		5-2	47-60	---	---	100	100	99	97	96	94	78	55	49.4	23.2	A-7-6 (15)	CL

See footnote at end of table.

TABLE 19.--ENGINEERING INDEX TEST DATA--Continued

Soil name and location	Parent material	Report number	Depth	Moisture density: MAX	Moisture density: OPT	Percentage passing sieve*--: No. 4	No. 10	No. 40	No. 200	Percentage smaller than*--: 0.05 mm	0.02 mm	0.005 mm	0.002 mm	LL	PI	Classification: AASHTO	UN
			In	Lb/cf	Pct									Pct			
Rozetta silt loam: About 2,325 feet south and 1,040 feet west of the northeast corner of sec. 7, T. 14 N., R. 4 E.	Loess.	S84WI-057-1-1	16-24	---	---	100	100	100	99	95	65	35	29	46.2	22.1	A-7-6 (14)	CL
		1-2	50-60	---	---	100	100	100	88	82	42	19	15	30.0	7.5	A-4(8)	CL
Wildale cherty silt loam: About 650 feet south and 1,970 feet east of the northwest corner of sec. 26, T. 14 N., R. 3 E.	Dominantly clayey residuum weathered from dolomite bedrock.	S83WI-057-2-1	16-43	---	---	92	91	89	77	76	75	73	70	85.8	47.8	A-7-5 (20)	MH
Wyeville sand: About 2,430 feet north and 100 feet west of the southeast corner of sec. 4, T. 17 N., R. 2 E.	Sandy deposits and the underlying clayey lacustrine deposits.	S83WI-057-4-6	32-40	---	---	100	100	99	92	91	88	67	45	47.7	22.3	A-7-6 (14)	CL
		4-8	48-60	---	---	100	100	100	96	94	89	68	49	53.0	28.3	A-7-6 (18)	CL

* Mechanical analysis according to the AASHTO Designation T88-57 (1). Results from this procedure can differ somewhat from the results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by hydrometer method and the various grain-size fractions are calculated on the basis of all material up to and including that 3 inches in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculation of grain-size fractions. The mechanical analysis data given in this table are not suitable for use in naming textural classes of soils.

TABLE 20.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Algansee	Mixed, mesic Aquic Udipsamments
Billett	Coarse-loamy, mixed, mesic Mollic Hapludalfs
Boone	Mesic, uncoated Typic Quartzipsamments
Curran	Fine-silty, mixed, mesic Udollic Ochraqualfs
Dawson	Sandy or sandy-skeletal, mixed, dysic Terric Borosaprists
Delton	Loamy, mixed, mesic Arenic Hapludalfs
Eleva	Coarse-loamy, mixed, mesic Typic Hapludalfs
Elkmound	Loamy, mixed, mesic Lithic Dystrochrepts
Ettrick	Fine-silty, mixed, mesic Fluvaquentic Haplaquolls
Friendship	Mixed, frigid Typic Udipsamments
Gale	Fine-silty over sandy or sandy-skeletal, mixed, mesic Typic Hapludalfs
Glendora	Mixed, mesic Mollic Psammaquents
Hixton Variant	Coarse-loamy, mixed, mesic Aquollic Hapludalfs
Jackson	Fine-silty, mixed, mesic Typic Hapludalfs
Korobago	Coarse-loamy over clayey, mixed, mesic Aquic Eutrochrepts
La Farge	Fine-silty, mixed, mesic Typic Hapludalfs
Lows	Fine-loamy over sandy or sandy-skeletal, mixed, nonacid, frigid Mollic Haplaquepts
Loxley	Dysic Typic Borosaprists
Manawa	Fine, mixed, mesic Aquollic Hapludalfs
Meehan	Mixed, frigid Aquic Udipsamments
Meridian	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Mollic Hapludalfs
NewGlarus	Fine-silty over clayey, mixed, mesic Typic Hapludalfs
Newson	Mixed, frigid Humaqueptic Psammaquents
Orion	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents
Palms	Loamy, mixed, euic, mesic Terric Medisaprists
Partridge	Mixed, mesic Aquic Udipsamments
Plainbo	Mixed, frigid Typic Udipsamments
Plainfield	Mixed, mesic Typic Udipsamments
Poygan	Fine, mixed, mesic Typic Haplaquolls
Psammaquents	Mixed, frigid Typic Psammaquents
Reedsburg	Fine-silty, mixed, mesic Aquic Paleudalfs
*Roby	Coarse-loamy, mixed, mesic Aquic Hapludalfs
Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs
Udorthents	Mixed, mesic Typic Udorthents
Urne	Coarse-loamy, mixed, mesic Dystric Eutrochrepts
Wautoma	Sandy over clayey, mixed, nonacid, mesic Mollic Haplaquents
Wildale	Fine, mixed, mesic Mollic Paleudalfs
Wyeville	Clayey, mixed, mesic Aquic Arenic Hapludalfs

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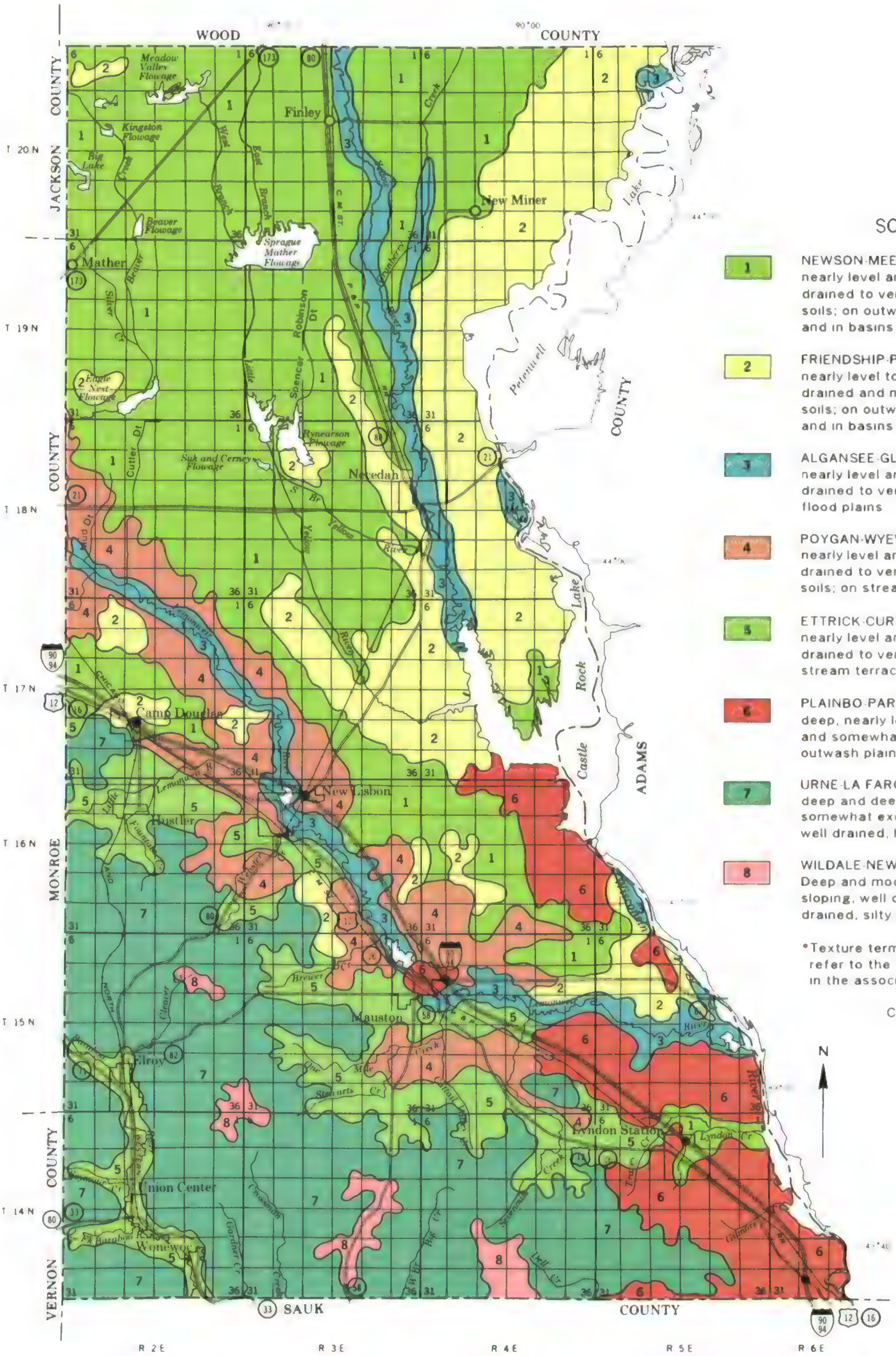


SOIL LEGEND*

1 NEWSON-MEEHAN-DAWSON association: Deep, nearly level and gently sloping, somewhat poorly drained to very poorly drained, sandy and mucky soils; on outwash plains, on stream terraces, and in basins of glacial lakes

2 FRIENDSHIP-PLAINFIELD association: Deep, nearly level to moderately steep, excessively drained and moderately well drained, sandy soils; on outwash plains, on stream terraces, and in basins of glacial lakes

3 ALGANSEE-GLENDORA association: Deep, nearly level and gently sloping, somewhat poorly drained to very poorly drained, loamy soils; on flood plains

4 POYGAN-WYEVILLE-WAUTOMA association: Deep, nearly level and gently sloping, somewhat poorly drained to very poorly drained, silty and sandy soils; on stream terraces and lake terraces

5 ETTRICK-CURRAN-JACKSON association: Deep, nearly level and gently sloping, moderately well drained to very poorly drained, silty soils; on stream terraces, lake terraces, and flood plains

6 PLAINBO-PARTRIDGE association: Moderately deep, nearly level to sloping, excessively drained and somewhat poorly drained, sandy soils; on outwash plains, stream terraces, and uplands

7 URNE-LA FARGE-ROZETTA association: Moderately deep and deep, gently sloping to very steep, somewhat excessively drained to moderately well drained, loamy and silty soils; on uplands

8 WILDALE-NEWGLARUS-REEDSBURG association: Deep and moderately deep, gently sloping and sloping, well drained and somewhat poorly drained, silty soils; on uplands

*Texture terms in the descriptive headings refer to the surface layer of the major soils in the associations.

Compiled 1989

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
THE RESEARCH DIVISION OF THE COLLEGE OF AGRICULTURAL AND LIFE SCIENCES
UNIVERSITY OF WISCONSIN

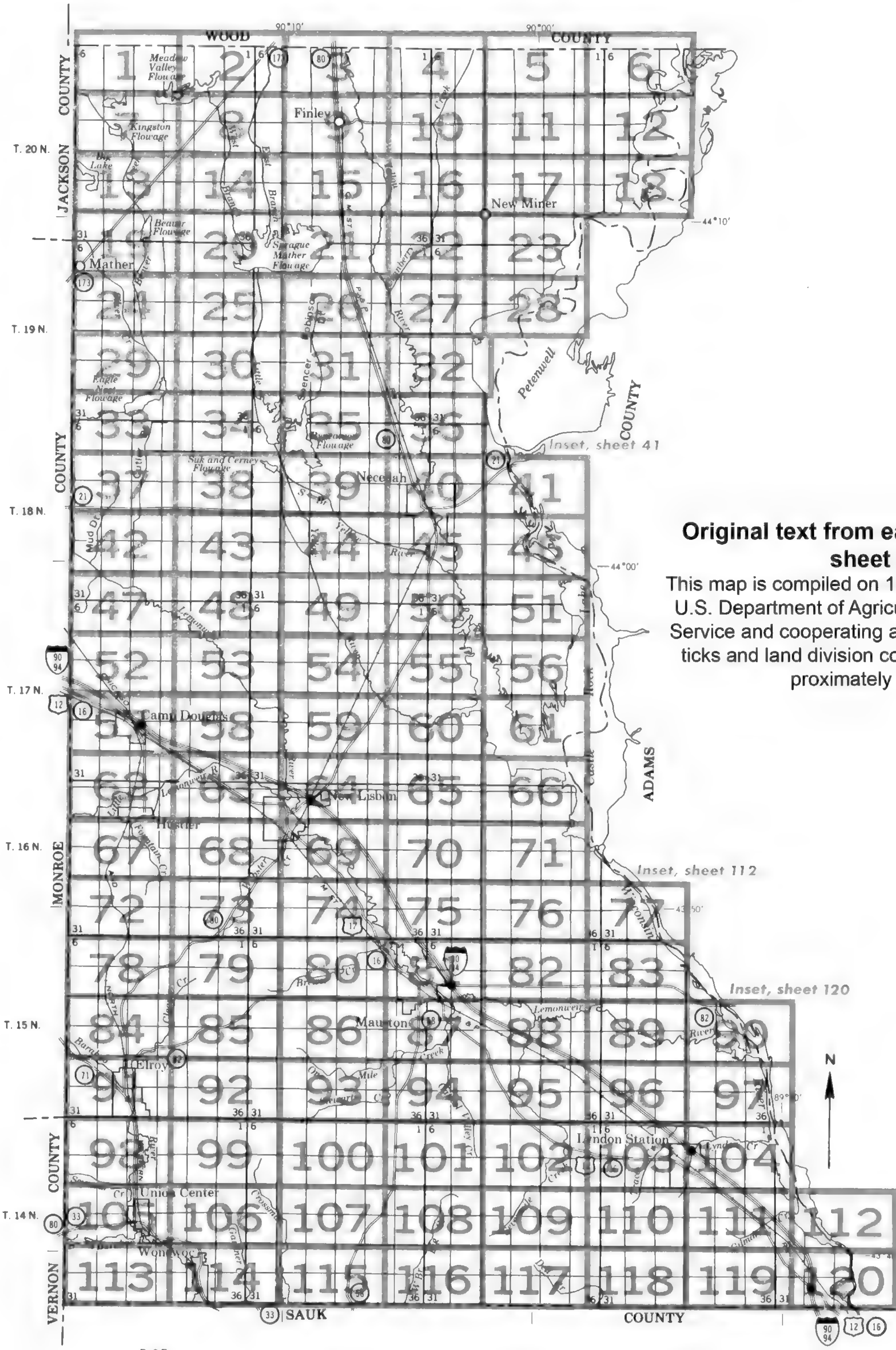
GENERAL SOIL MAP

JUNEAU COUNTY, WISCONSIN

Scale 1:253,440

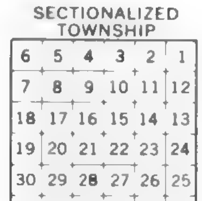
1 0 1 2 3 4 Miles

1 0 4 8 Km



Original text from each individual map sheet read:
This map is compiled on 1978 aerial imagery by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SECTIONALIZED TOWNSHIP



INDEX TO MAP SHEETS

JUNEAU COUNTY, WISCONSIN

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

SOIL LEGEND

Map symbols consist of a combination of letters or of letters and a number. The first capital letter is the initial one of the map unit name. The lowercase letter that follows separates map units having names that begin with the same letter, except that it does not separate sloping or eroded phases. The second capital letter indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of 2 indicates that the soil is moderately eroded.

SYMBOL	NAME
AgA	Algansee-Glendora fine sandy loams, 0 to 3 percent slopes
[redacted]	Billett sandy loam, 1 to 6 percent slopes
BlC2	Billett sandy loam, 6 to 12 percent slopes, eroded
[redacted]	Billett sandy loam, moderately well drained, 1 to 6 percent slopes
BpF	Boone-Plainfield-Rock outcrop complex, 12 to 60 percent slopes
CuA	Curran silt loam, 0 to 3 percent slopes
Dc	Dawson muck, 0 to 1 percent slopes
DeB	Delton loamy fine sand, moderately well drained, 1 to 6 percent slopes
EeB	Eleva sandy loam, 2 to 6 percent slopes
EeC2	Eleva sandy loam, 6 to 12 percent slopes, eroded
EeD2	Eleva sandy loam, 12 to 20 percent slopes, eroded
EkF	Eleva-Boone-Rock outcrop complex, 30 to 60 percent slopes
[redacted]	Elkmound sandy loam, 1 to 6 percent slopes
Et	Ettrick silt loam, 0 to 2 percent slopes
FrB	Friendship sand, 1 to 6 percent slopes
FsB	Friendship loamy sand, loamy substratum, 1 to 6 percent slopes
GaB	Gale silt loam, 2 to 6 percent slopes
GaC2	Gale silt loam, 6 to 12 percent slopes, eroded
HvA	Hixton Variant loam, 0 to 3 percent slopes
JaB	Jackson silt loam, 2 to 6 percent slopes
KyA	Korobago sandy loam, 0 to 3 percent slopes
LfB	La Farge silt loam, 2 to 6 percent slopes
LfC2	La Farge silt loam, 6 to 12 percent slopes, eroded
LfD2	La Farge silt loam, 12 to 20 percent slopes, eroded
Lw	Lows loam, 0 to 2 percent slopes
Lx	Loxley muck, 0 to 1 percent slopes
MaA	Manawa silt loam, 0 to 3 percent slopes
MeA	Meehan sand, 0 to 3 percent slopes
MnA	Meehan-Newson complex, 0 to 3 percent slopes
MrB	Meridian loam, 2 to 6 percent slopes
NaB	NewGlarus silt loam, 2 to 6 percent slopes
NaC2	NewGlarus silt loam, 6 to 12 percent slopes, eroded
Ne	Newson mucky loamy sand, 0 to 2 percent slopes
Ns	Newson-Dawson complex, 0 to 2 percent slopes
OrA	Orion silt loam, 0 to 3 percent slopes
Pa	Palms muck, 0 to 1 percent slopes
PbA	Partridge loamy fine sand, 0 to 3 percent slopes
Pc	Pits
PdB	Plainbo sand, 1 to 6 percent slopes
PdC	Plainbo sand, 6 to 12 percent slopes
PfB	Plainfield sand, 1 to 6 percent slopes
PfC	Plainfield sand, 6 to 12 percent slopes
PfD	Plainfield sand, 12 to 20 percent slopes
Po	Poygan silt loam, 0 to 2 percent slopes
Ps	Psammaquents, nearly level
RbB	Reedsburg silt loam, 2 to 6 percent slopes
RoA	Roby sandy loam, 0 to 3 percent slopes
RzB	Rozetta silt loam, 2 to 6 percent slopes
RzC2	Rozetta silt loam, 6 to 12 percent slopes, eroded
RzD2	Rozetta silt loam, 12 to 20 percent slopes, eroded
Ud	Udorthents, nearly level
UfB	Urne very fine sandy loam, 2 to 6 percent slopes
UfC2	Urne very fine sandy loam, 6 to 12 percent slopes, eroded
UfD2	Urne very fine sandy loam, 12 to 20 percent slopes, eroded
UfE	Urne very fine sandy loam, 20 to 30 percent slopes
UfF	Urne very fine sandy loam, 30 to 60 percent slopes
Wa	Wautoma loamy sand, 0 to 2 percent slopes
WdB	Wildale cherty silt loam, 2 to 6 percent slopes
WdC2	Wildale cherty silt loam, 6 to 12 percent slopes, eroded
WeA	Wyeville sand, 0 to 3 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- County
- Reservation, national wildlife refuge or state park
- Field sheet matchline & neatline

AD HOC BOUNDARY

- Small airport, airfield, park or cemetery

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate 94
- Federal 12
- State 16
- County 6

RAILROAD

LEVEES

- Without road

DAMS

- Large
- Medium or small

PITS

- Quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house
- Church
- School

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Ditches

LAKES, PONDS AND RESERVOIRS

- Perennial

MISCELLANEOUS WATER FEATURES

- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS Et RoA

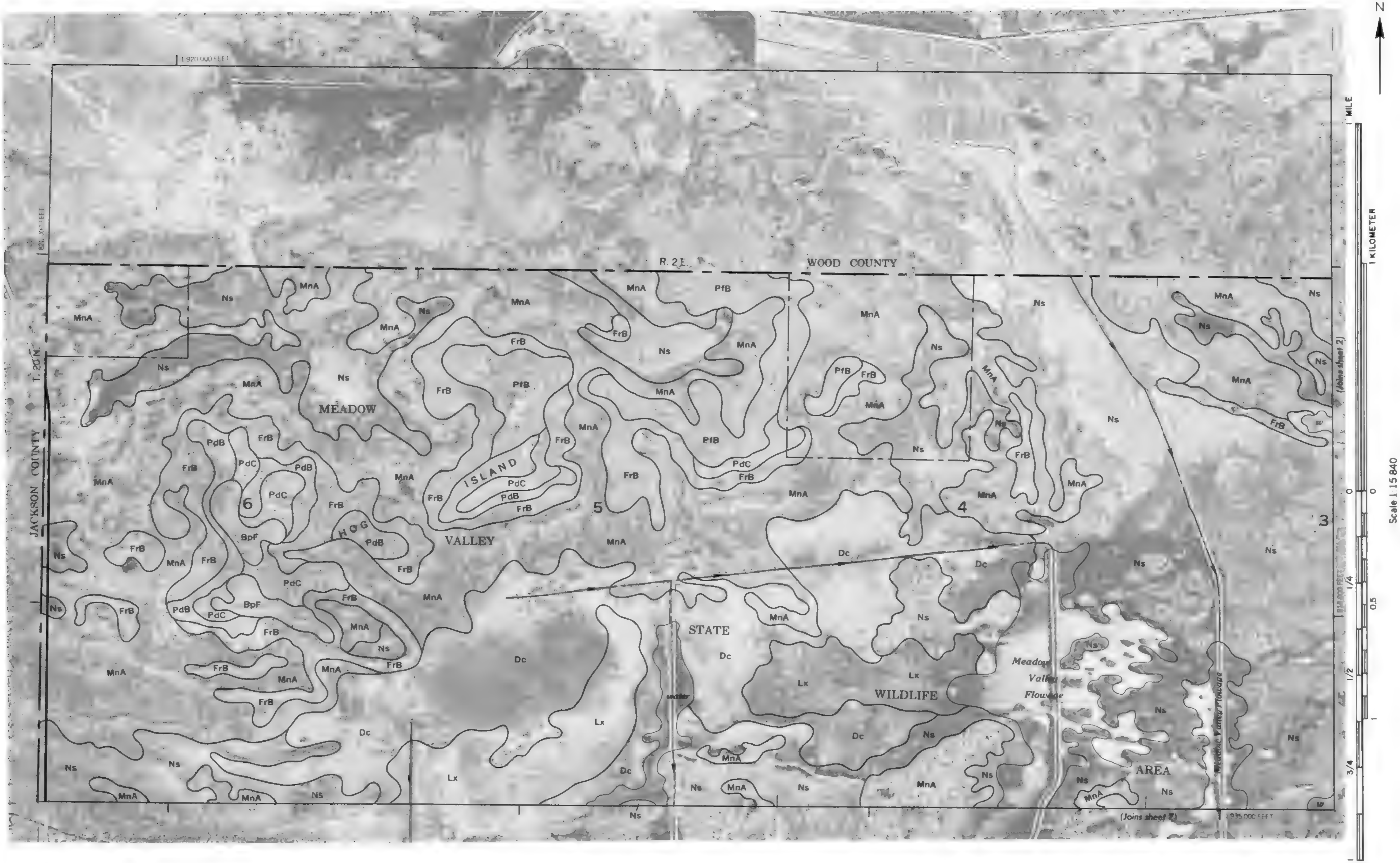
ESCARPMENTS

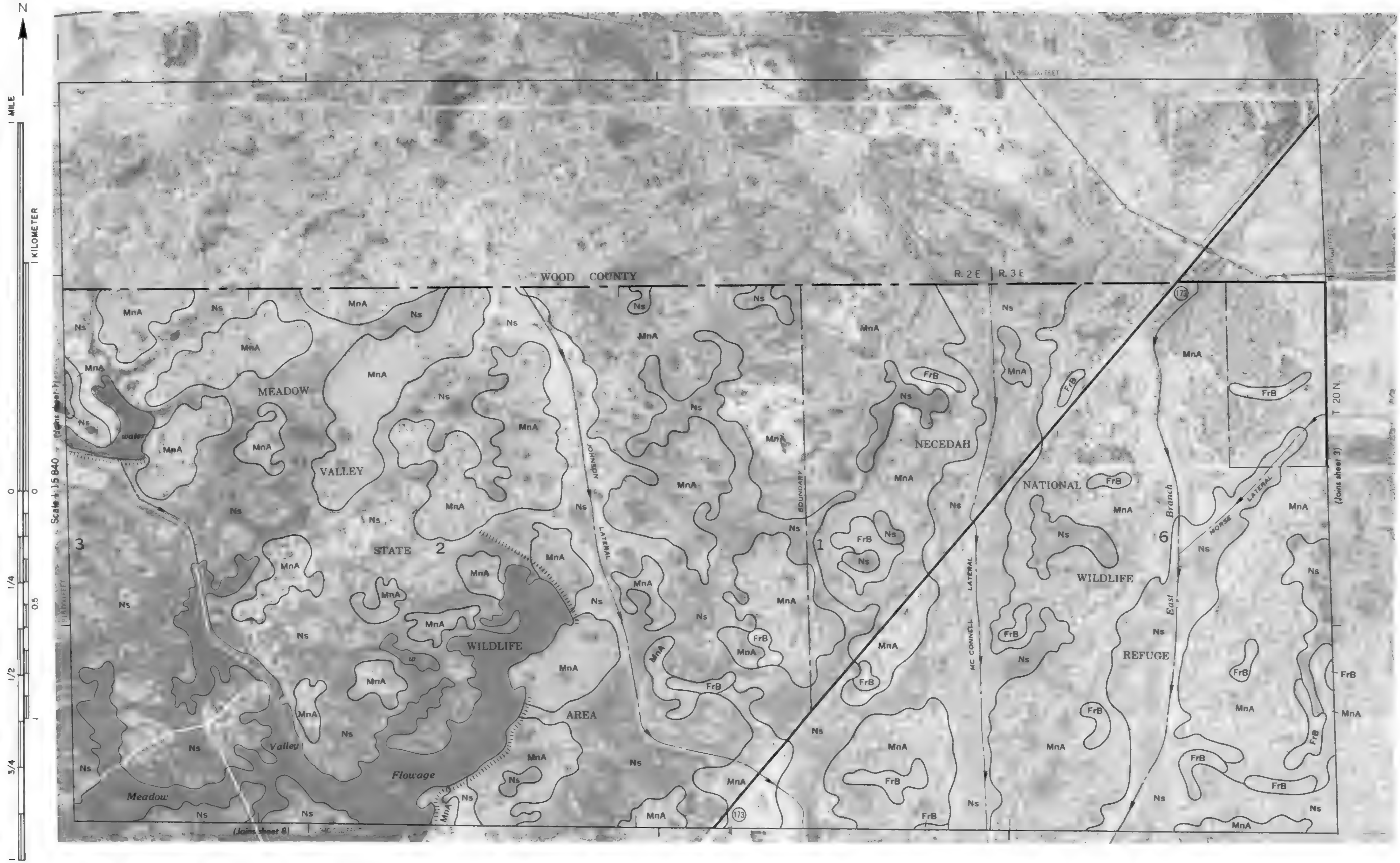
- Other than bedrock

SHORT STEEP SLOPE

MISCELLANEOUS

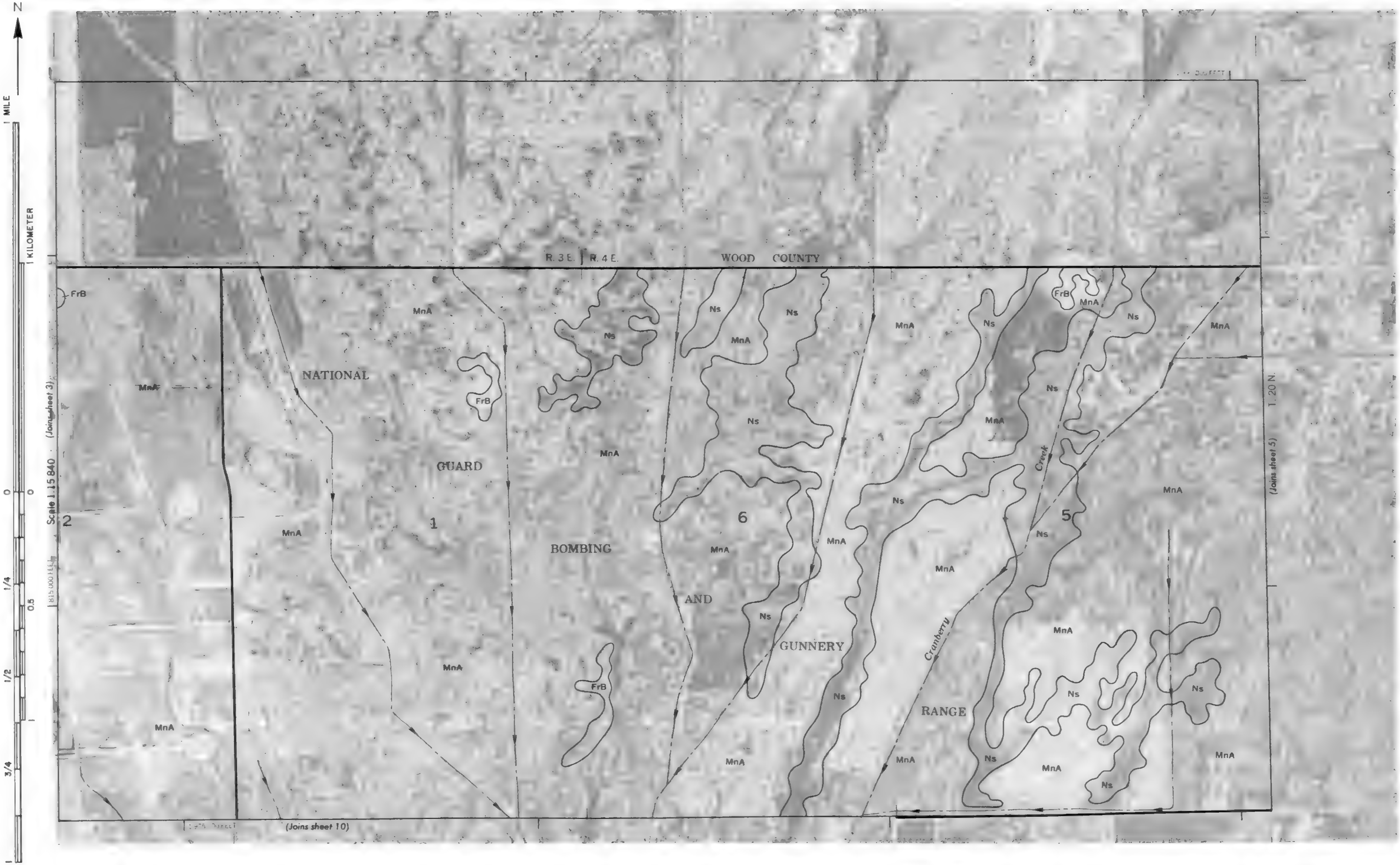
- Blowout (<3 acres)
- Bouldery spot (<3 acres)
- Gravelly spot (<3 acres)
- Pits, sand (<3 acres)
- Rock outcrop (<3 acres)
- Sandy spot (<3 acres)
- Sanitary landfill (<5 acres)


WOOD COUNTY
JACKSON COUNTY
R. 2 E.
T. 20 N.
MEADOW
ISLAND
HOG
VALLEY
STATE
WILDLIFE
AREA
Meadow Valley Flowage
(Joins sheet 2)
(Joins sheet 7)
1 920 000 FEET
1 935 000 FEET
N
1 MILE
1 KILOMETER
Scale 1:15 840
6
5
4
3
MnA
Ns
FrB
PfB
PdB
PdC
BpF
Dc
Lx
water


N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
WOOD COUNTY
R. 2 E.
R. 3 E.
T. 20 N.
MEADOW
VALLEY
STATE
WILDLIFE
AREA
NECEDAH
NATIONAL
WILDLIFE
REFUGE
Meadow
Valley
Flowage
water
JOHNSON LATERAL
BOUNDARY
MC CONNELL LATERAL
MORSE LATERAL
East Branch
173
(Joins sheet 8)
(Joins sheet 3)
MnA
Ns
FrB
1
2
3
6


3
N
1 955 100 FEET
WOOD COUNTY
R. 3 E.
T. 20 N.
MORSE LATERAL
NECEDAH
NATIONAL
WILDLIFE
REFUGE
NATIONAL
GUARD
BOMBING
AND
GUNNERY
RANGE
YELLOW
RIVER
CHICAGO
MILWAUKEE
ST. PAUL
AND
PACIFIC
ROBINSON
DITCH
EAST
BRANCH
SPENCER
DANIELSON
LATERAL
BOUNDARY
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 9)
MnA
AgA
FrB
Ns
1
2
3
4
5
80
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840

4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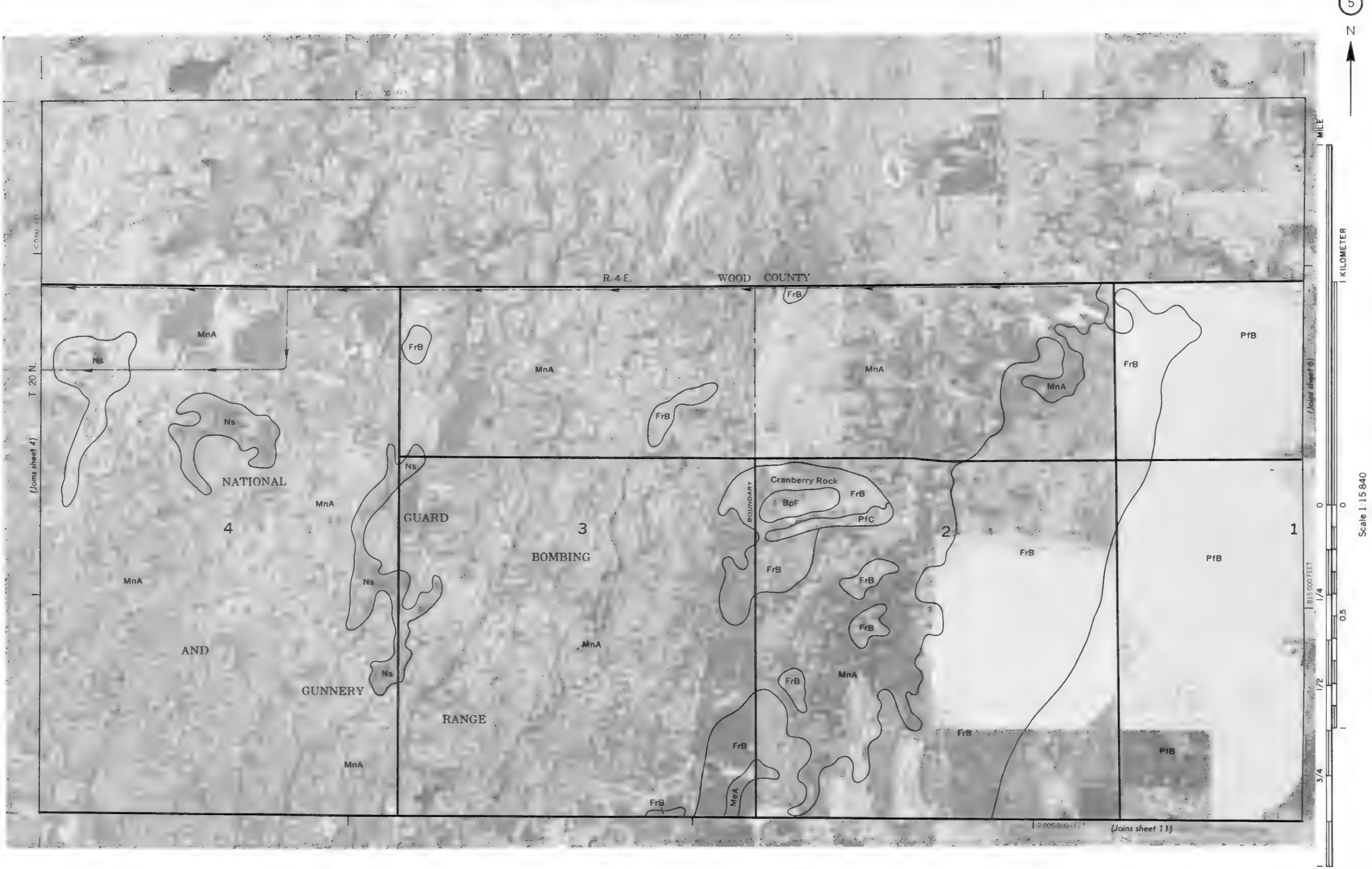
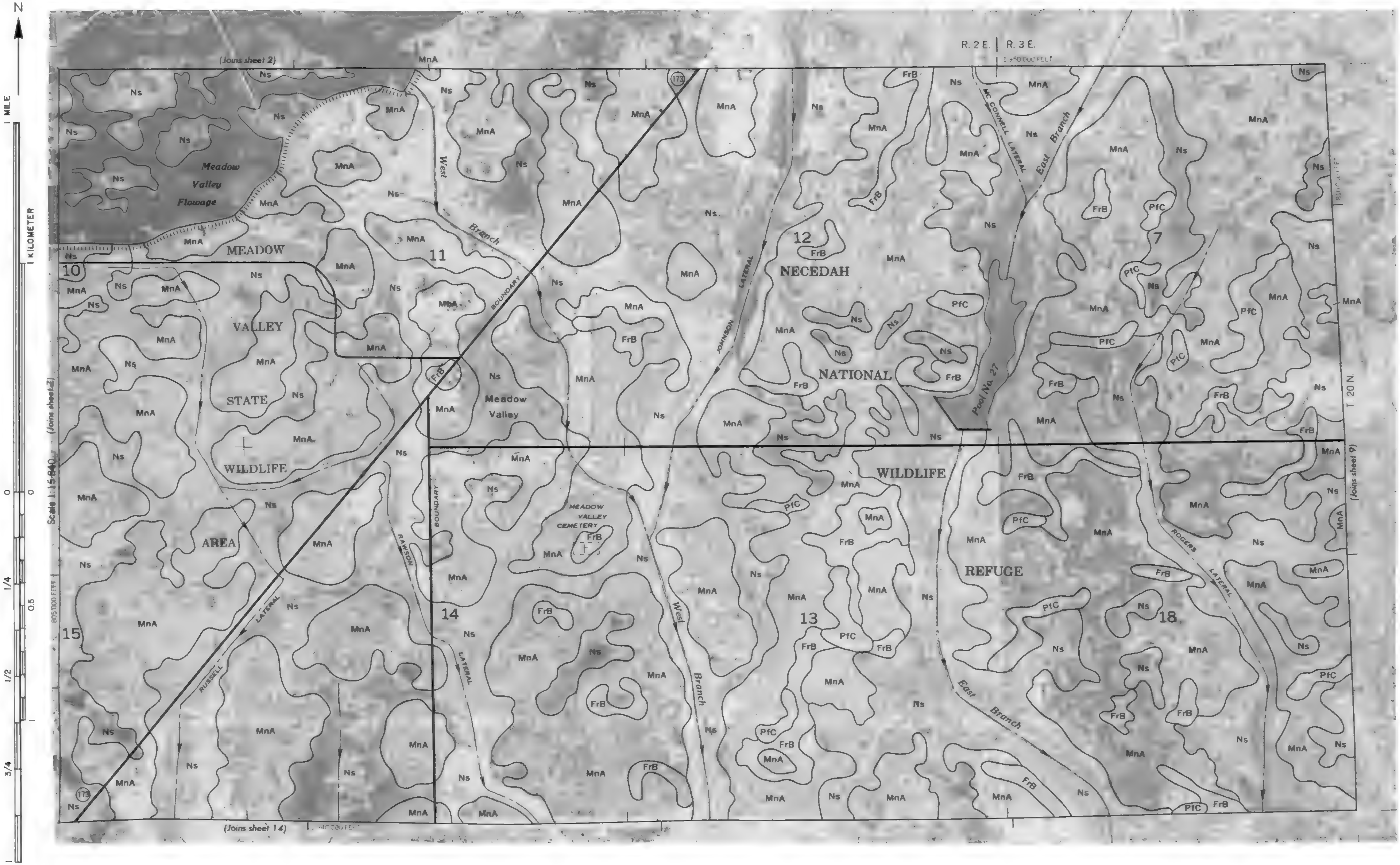
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0
0.5
1
Scale 1:15 840
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 10)
R. 3 E. | R. 4 E.
WOOD COUNTY
T. 20 N.
NATIONAL
GUARD
BOMBING
AND
GUNNERY
RANGE
Cranberry
Creek
1
2
5
6
FrB
MnA
Ns


5
N
WOOD COUNTY
R. 4 E.
T. 20 N.
(Joins sheet 4)
(Joins sheet 6)
(Joins sheet 11)
NATIONAL
GUARD
BOMBING
AND
GUNNERY
RANGE
BOUNDARY
Cranberry Rock
4
3
2
1
MnA
Ns
FrB
PfB
BpF
PfC
MeA
MILE
KILOMETER
1/4
1/2
3/4
0.5
Scale 1:15 840


6
N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5
WOOD COUNTY
R.4 E. | R.5 E.
(Joins sheet 5)
(Joins sheet 12)
PfB
PfD
PfC
BlB
MrB
AgA
FrB
GREENWOOD CEMETERY
BmB
MeA
WISCONSIN RIVER
ADAMS COUNTY
T.20 N.
PETENWELL LAKE


(Joins sheet 1)
R. 2 E.
T. 20 N.
JACKSON COUNTY
MEADOW
VALLEY
STATE
WILDLIFE
AREA
Beaver Creek
Meadow Valley Flowage
Kingston Flowage
NEAL LATERAL
Cemetery Hill
OAK GROVE CEMETERY
(Joins sheet 13)
7
8
9
10
15
16
17
18
Ns
MnA
Dc
Lx
Pc
PfC
BpF
PdB
PdC
FrB
PfB
w
N
MILE
KILOMETER
Scale 1:15 840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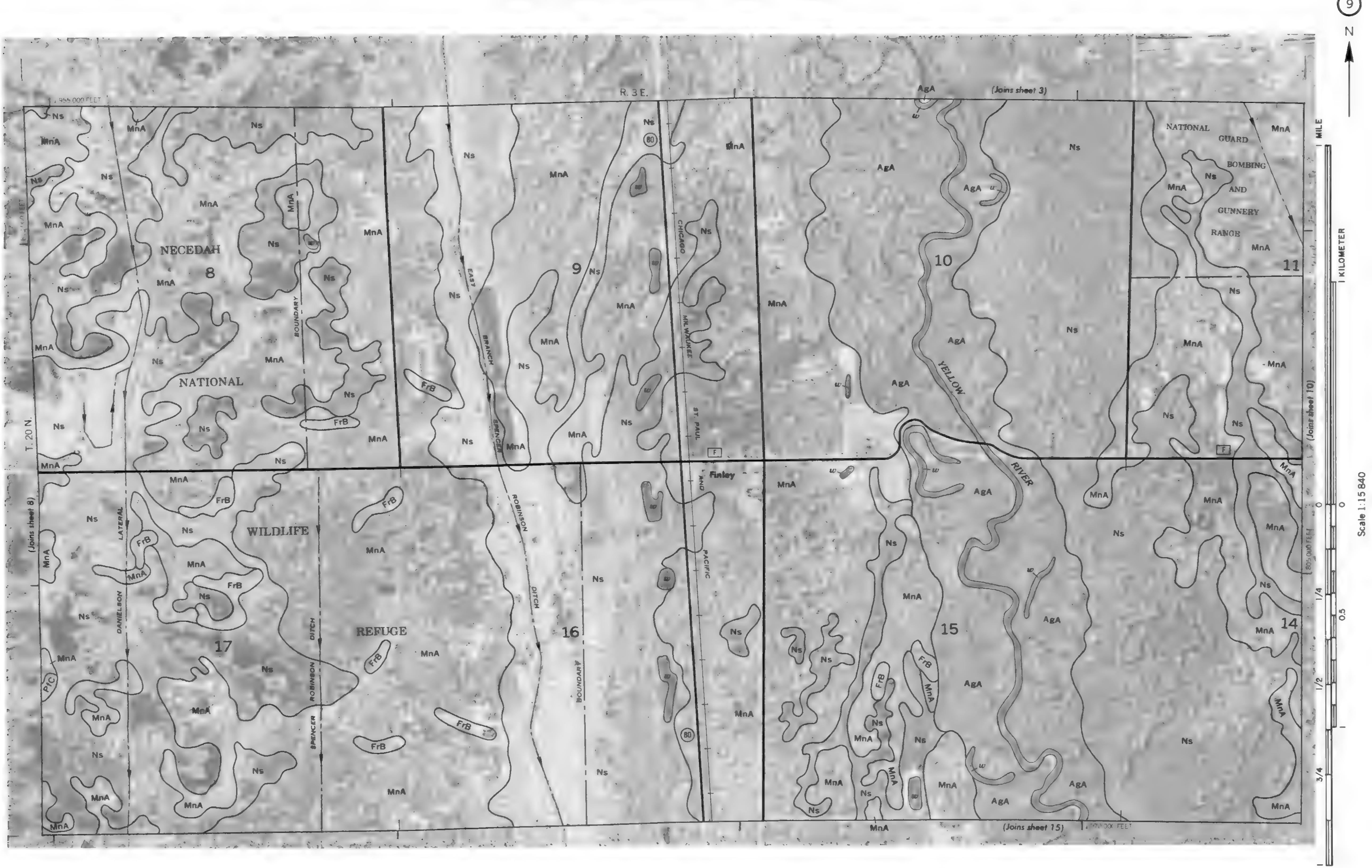
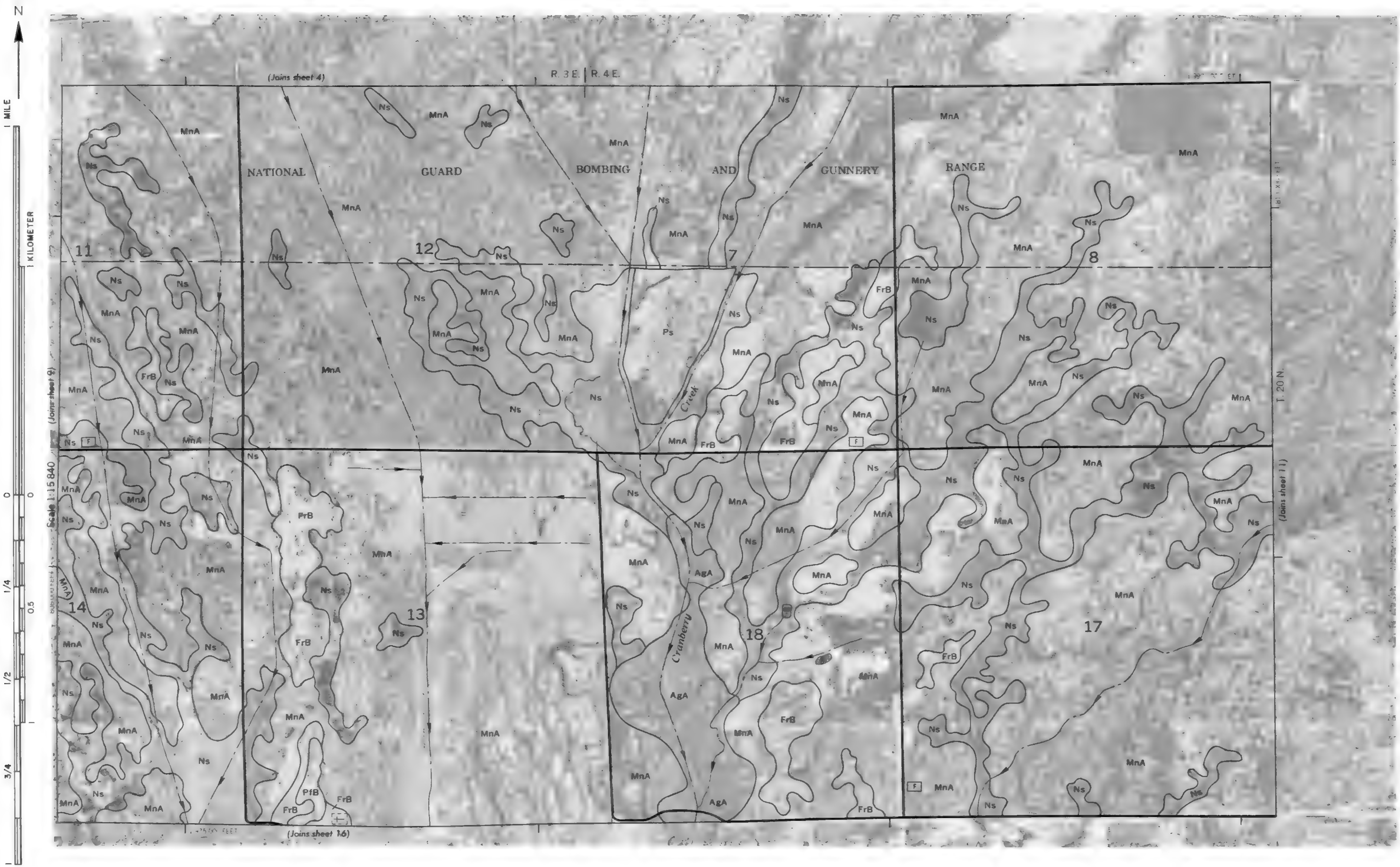
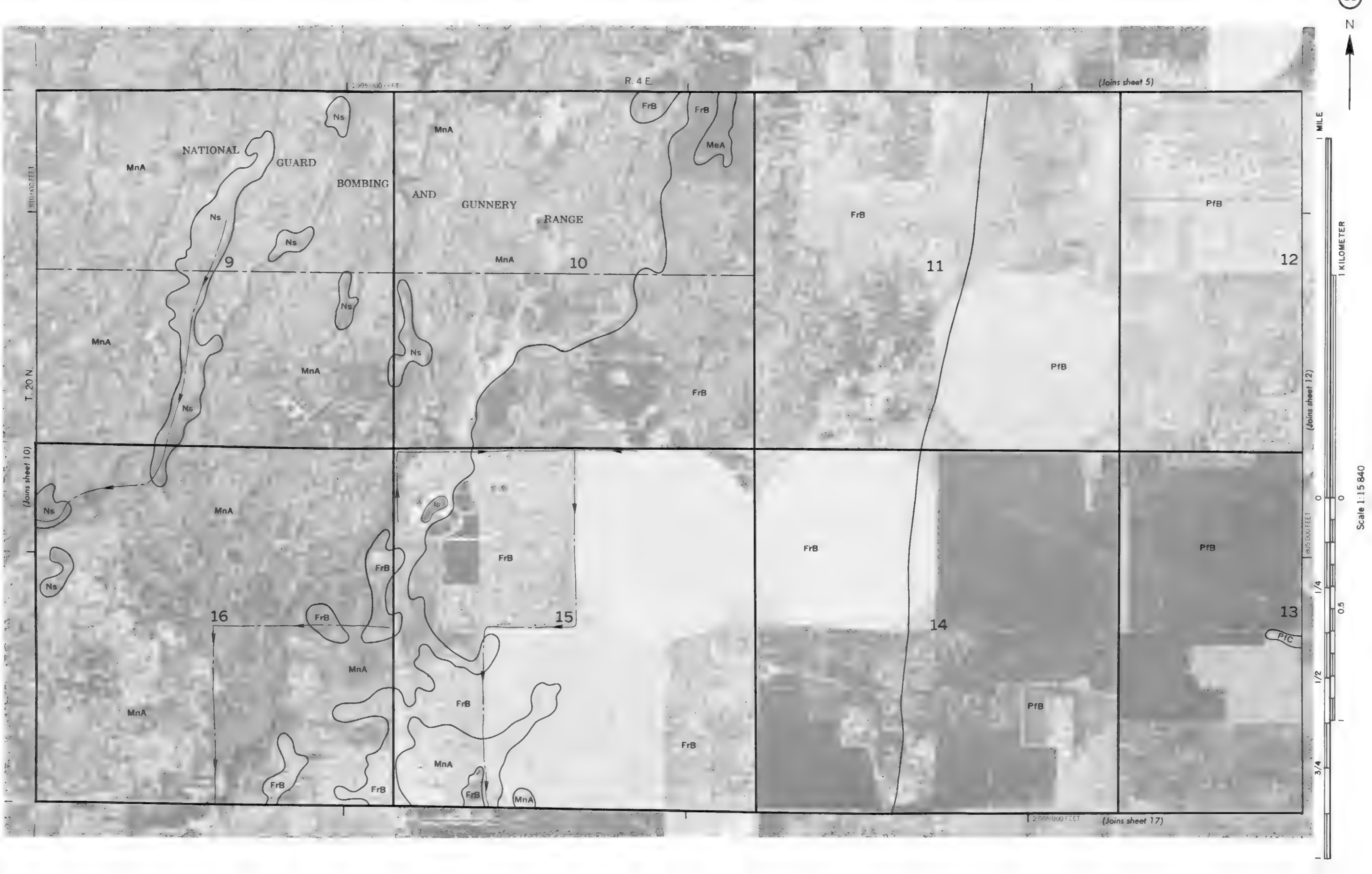
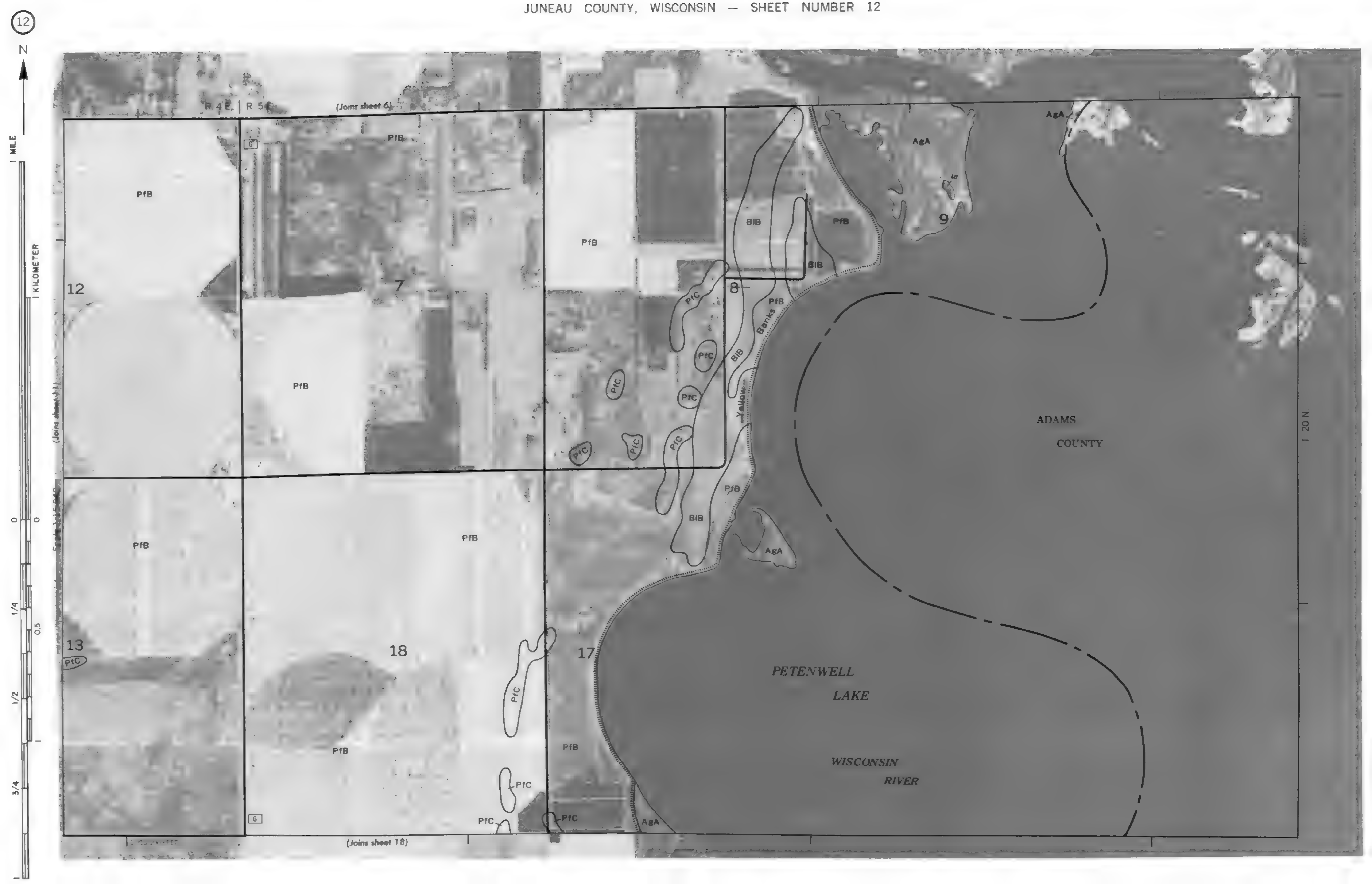
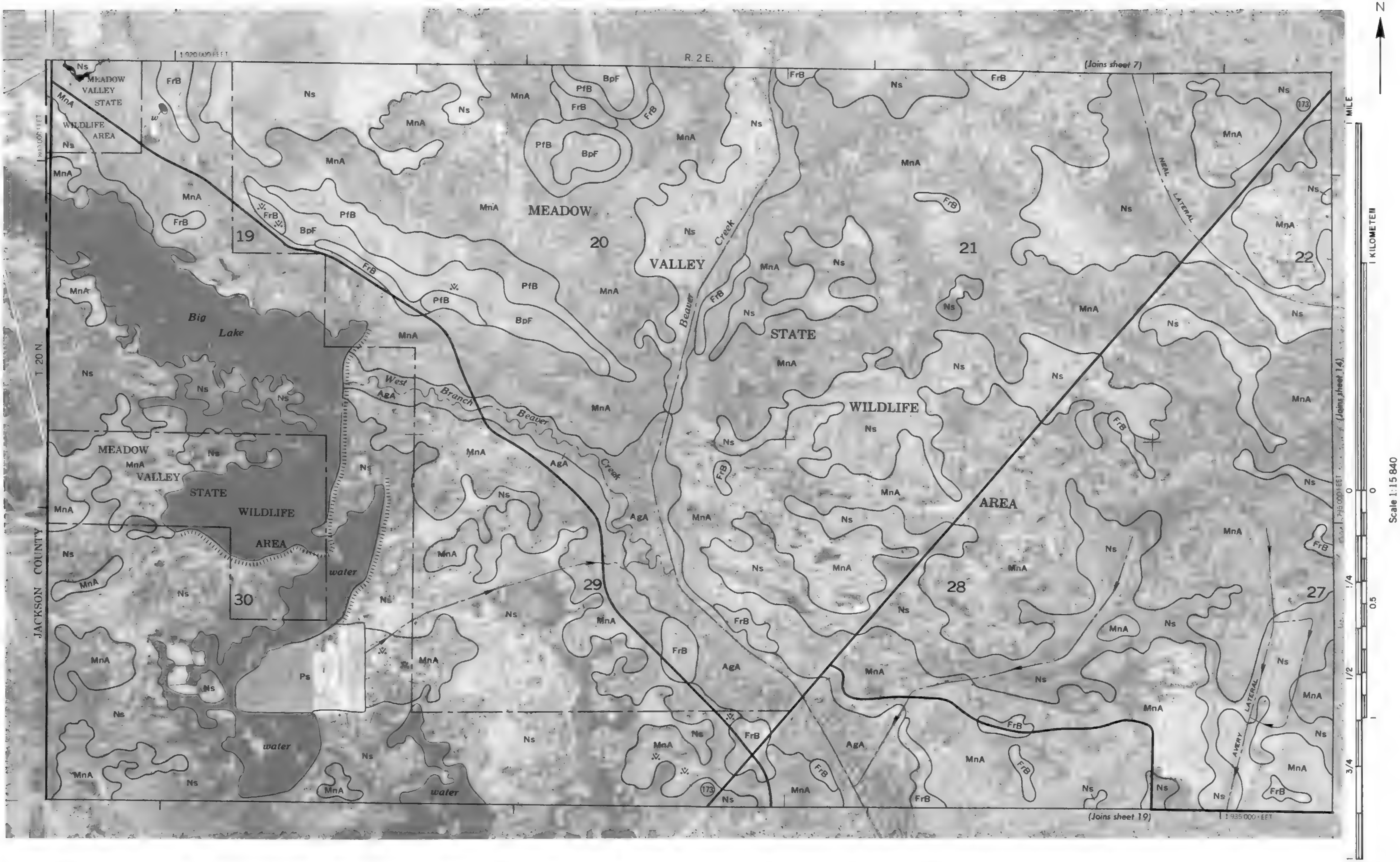
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5
(Joins sheet 2)
(Joins sheet 7)
(Joins sheet 9)
(Joins sheet 14)
R. 2 E.
R. 3 E.
T. 20 N.
Meadow Valley Flowage
MEADOW VALLEY STATE WILDLIFE AREA
NECEDAH NATIONAL WILDLIFE REFUGE
Meadow Valley
MEADOW VALLEY CEMETERY
West Branch
East Branch
BOUNDARY
JOHNSON LATERAL
MC CONNELL LATERAL
ROGERS LATERAL
RAWSON LATERAL
RUSSELL LATERAL
Pool No. 27
173
7
10
11
12
13
14
15
18
Ns
MnA
FrB
PfC


9
N
R. 3 E.
(Joins sheet 3)
(Joins sheet 8)
(Joins sheet 10)
(Joins sheet 15)
T. 20 N.
NECEDAH
NATIONAL
WILDLIFE
REFUGE
NATIONAL GUARD BOMBING AND GUNNERY RANGE
EAST BRANCH
SPENCER
ROBINSON DITCH
DANIELSON LATERAL
BOUNDARY
BOUNDARY DITCH
ROBINSON
SPENCER
CHICAGO
MILWAUKEE
ST. PAUL
AND
PACIFIC
YELLOW
RIVER
Finley
80
F
8
9
10
11
14
15
16
17
Ns
MnA
AgA
FrB
PfC
w
MILE
KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840

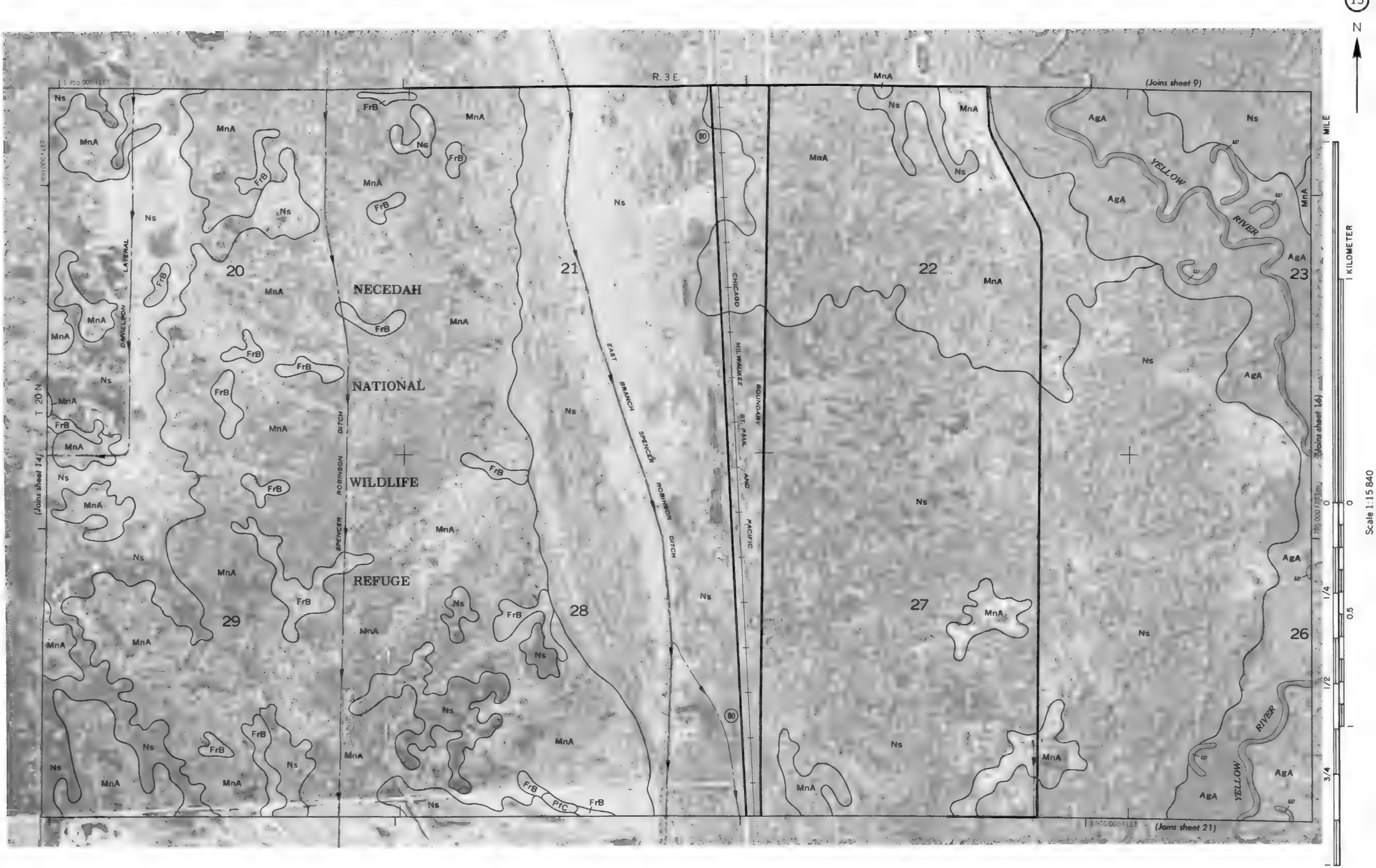

N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
(Joins sheet 4)
R. 3 E.
R. 4 E.
NATIONAL
GUARD
BOMBING
AND
GUNNERY
RANGE
(Joins sheet 9)
(Joins sheet 11)
(Joins sheet 16)
T. 20 N.
Creek
Cranberry
7
8
11
12
13
14
17
18
MnA
Ns
FrB
Ps
AgA
PfB
F

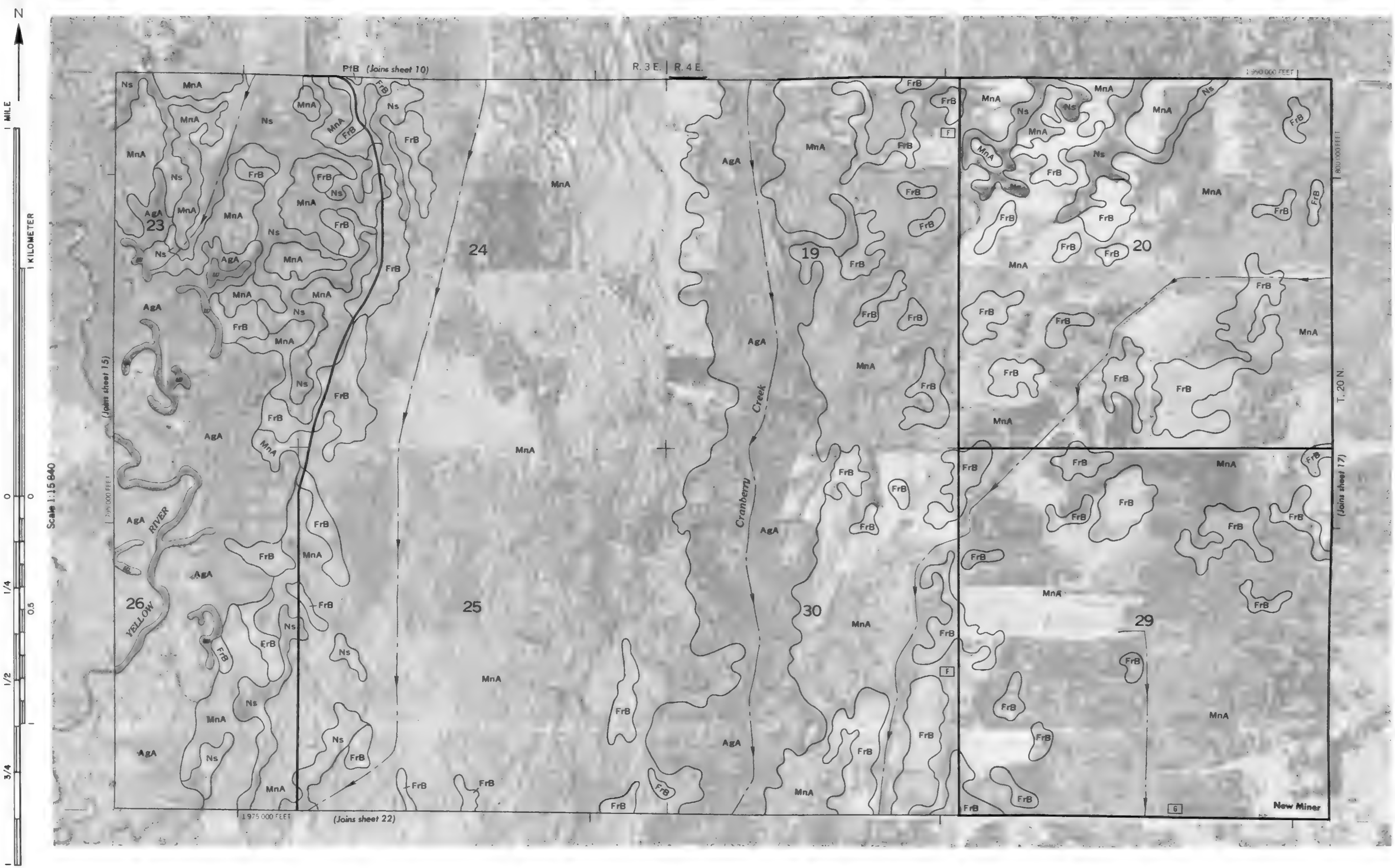

11
N
R. 4 E.
(Joins sheet 5)
NATIONAL GUARD BOMBING AND GUNNERY RANGE
MnA
Ns
FrB
MeA
PfB
PfC
9
10
11
12
13
14
15
16
T. 20 N.
(Joins sheet 10)
(Joins sheet 12)
(Joins sheet 17)
w
MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0.5


12
N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0
0.5
R 4 E. | R 5 E.
(Joins sheet 6)
(Joins sheet 11)
(Joins sheet 18)
T 20 N.
PfB
PfC
BlB
AgA
12
7
8
9
13
18
17
Banks
Yellow
ADAMS
COUNTY
PETENWELL
LAKE
WISCONSIN
RIVER

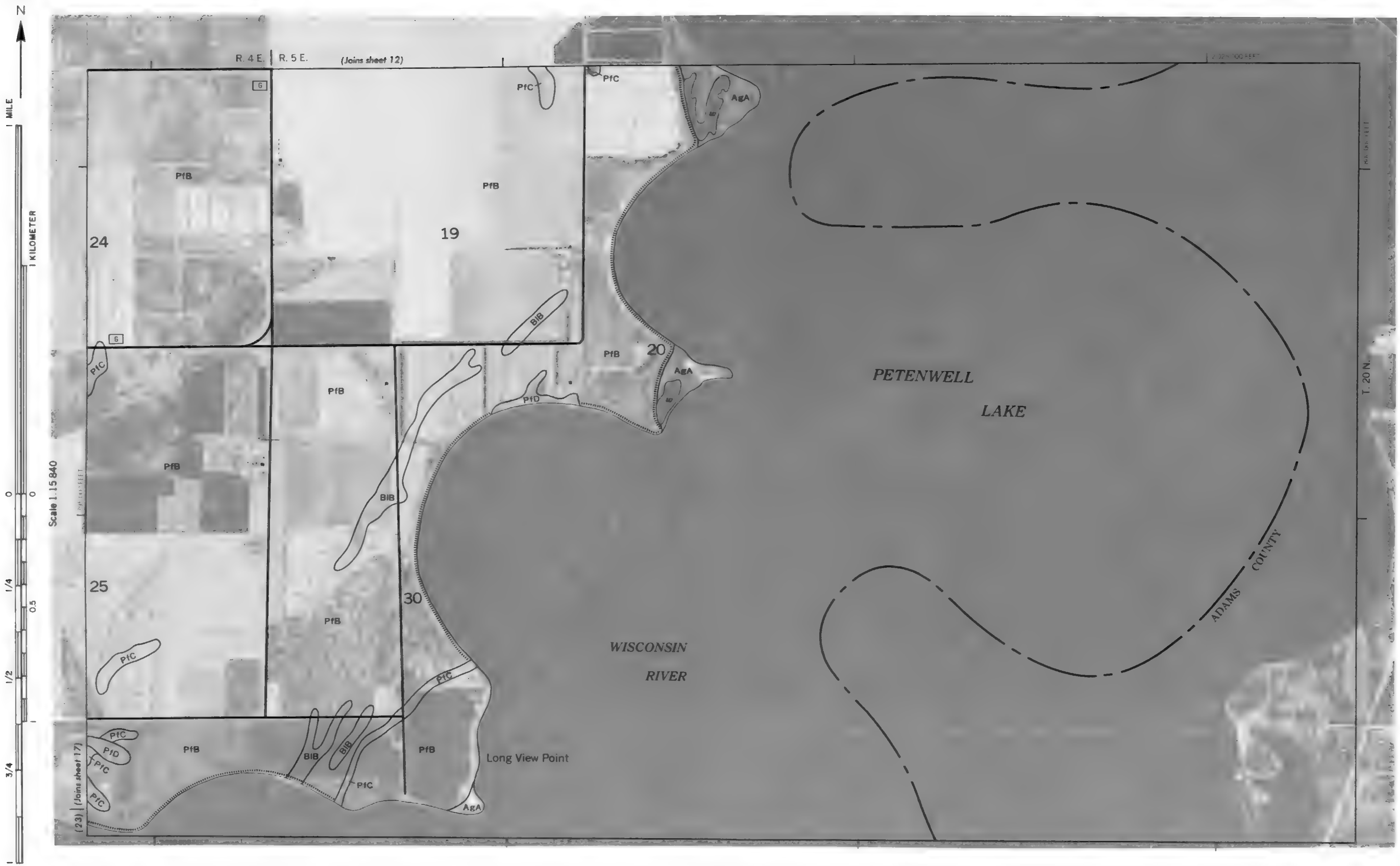

N
R. 2 E.
(Joins sheet 7)
(Joins sheet 14)
(Joins sheet 19)
T. 20 N.
JACKSON COUNTY
1 920 000 FEET
1 935 000 FEET
MEADOW VALLEY STATE WILDLIFE AREA
MEADOW
VALLEY
STATE
WILDLIFE
AREA
Big Lake
water
West Branch Beaver Creek
Beaver Creek
NEAL LATERAL
AVERY LATERAL
173
19
20
21
22
27
28
29
30
Ns
MnA
FrB
PfB
BpF
AgA
Ps
1 MILE
1 KILOMETER
3/4
1/2
1/4
0
0.5
Scale 1:15 840

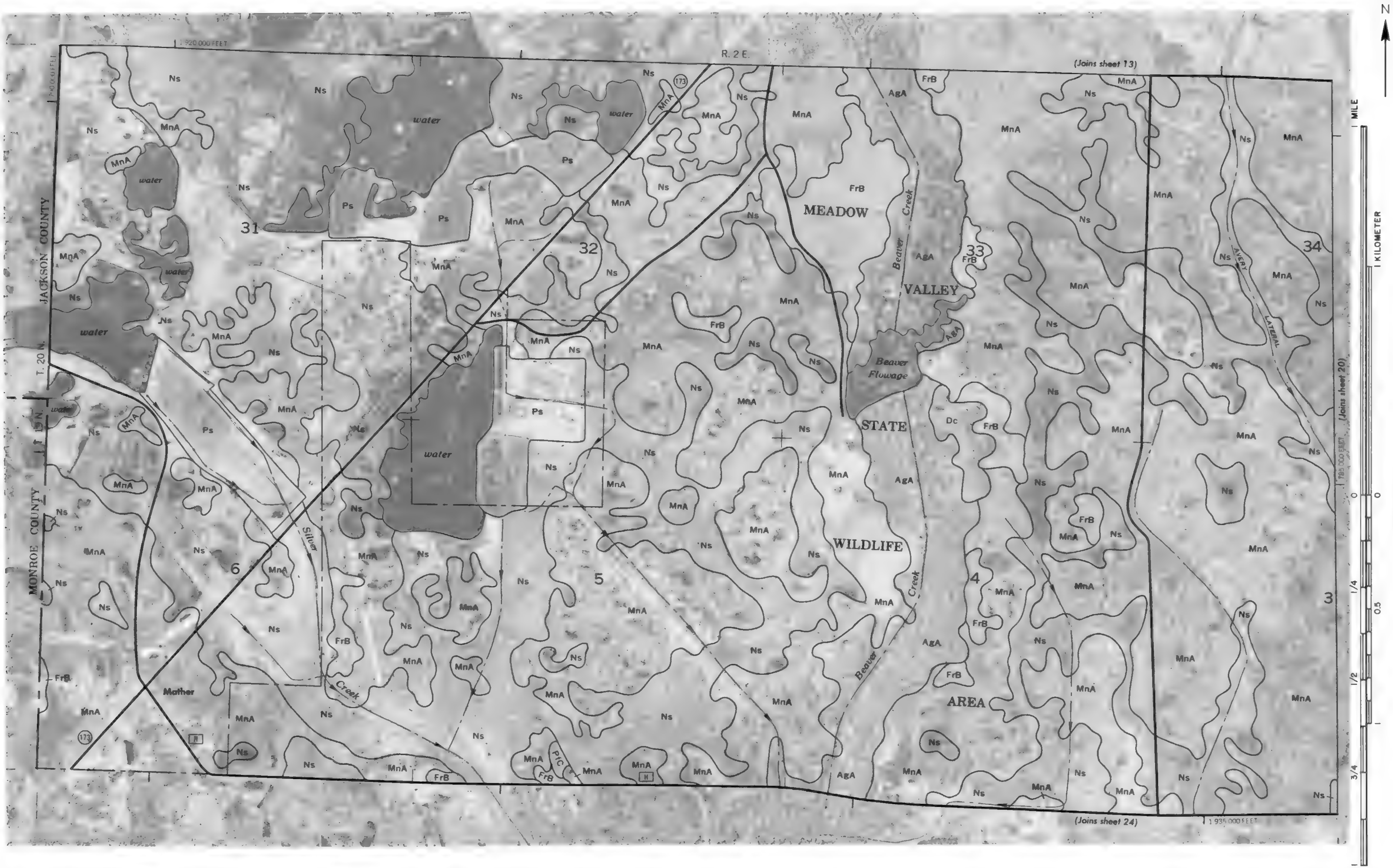

14
N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
(Joins sheet 8)
(Joins sheet 13)
(Joins sheet 15)
(Joins sheet 20)
R. 2 E.
R. 3 E.
T. 20 N.
173
MEADOW
VALLEY
STATE
WILDLIFE
AREA
NECEDAH
NATIONAL
WILDLIFE
REFUGE
RUSSELL LATERAL
RAWSON LATERAL
ROGERS LATERAL
NEAL LATERAL
WARD LATERAL
DANIELSON LATERAL
BOUNDARY
West Branch
East Branch
Pool No. 19
Pool No. 9
water
22
23
24
25
26
27
19
30
MnA
Ns
FrB
PfC


15
N
R. 3 E.
(Joins sheet 9)
(Joins sheet 14)
(Joins sheet 16)
(Joins sheet 21)
T 20 N
NECEDAH
NATIONAL
WILDLIFE
REFUGE
DANIELSON LATERAL
SPENCER ROBINSON DITCH
EAST BRANCH SPENCER ROBINSON DITCH
CHICAGO MILWAUKEE ST. PAUL AND PACIFIC
BOUNDARY
YELLOW RIVER
20
21
22
23
26
27
28
29
80
1 955 000 FEET
1 970 000 FEET
MnA
Ns
FrB
AgA
PfC
w
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
0.5
1/2
3/4

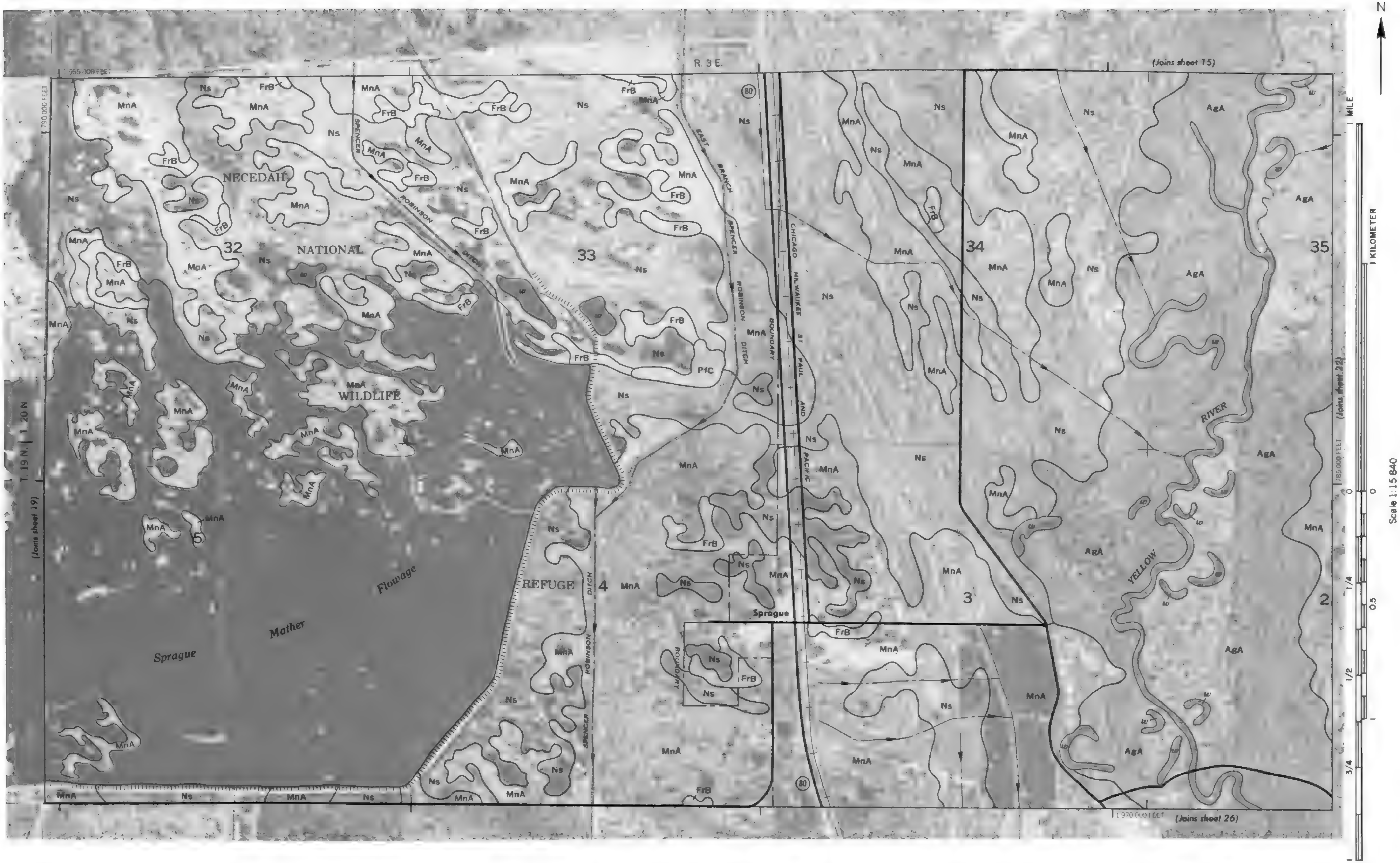

N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
PfB (Joins sheet 10)
R. 3 E. | R. 4 E.
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 22)
T. 20 N.
1 975 000 FEET
1 950 000 FEET
800 000 FEET
795 000 FEET
23
24
19
20
25
26
30
29
YELLOW RIVER
Cranberry Creek
New Miner
Ns
MnA
AgA
FrB
F
6


R. 4 E.
(Joins sheet 11)
1 995 000 FEET
T. 20 N.
(Joins sheet 16)
(Joins sheet 18)
(Joins sheet 23)
2 005 000 FEET
ST. PAUL'S CEMETERY
NOVOTNY CEMETERY
New Miner
21
22
23
24
25
26
27
28
FrB
MnA
MeA
PfB
PfC
PfD
6
N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840


N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5
R. 4 E.
R. 5 E.
(Joins sheet 12)
(Joins sheet 17)
(23)
T. 20 N.
PfB
PfC
PfD
AgA
BlB
24
19
20
25
30
PETENWELL
LAKE
WISCONSIN
RIVER
ADAMS COUNTY
Long View Point

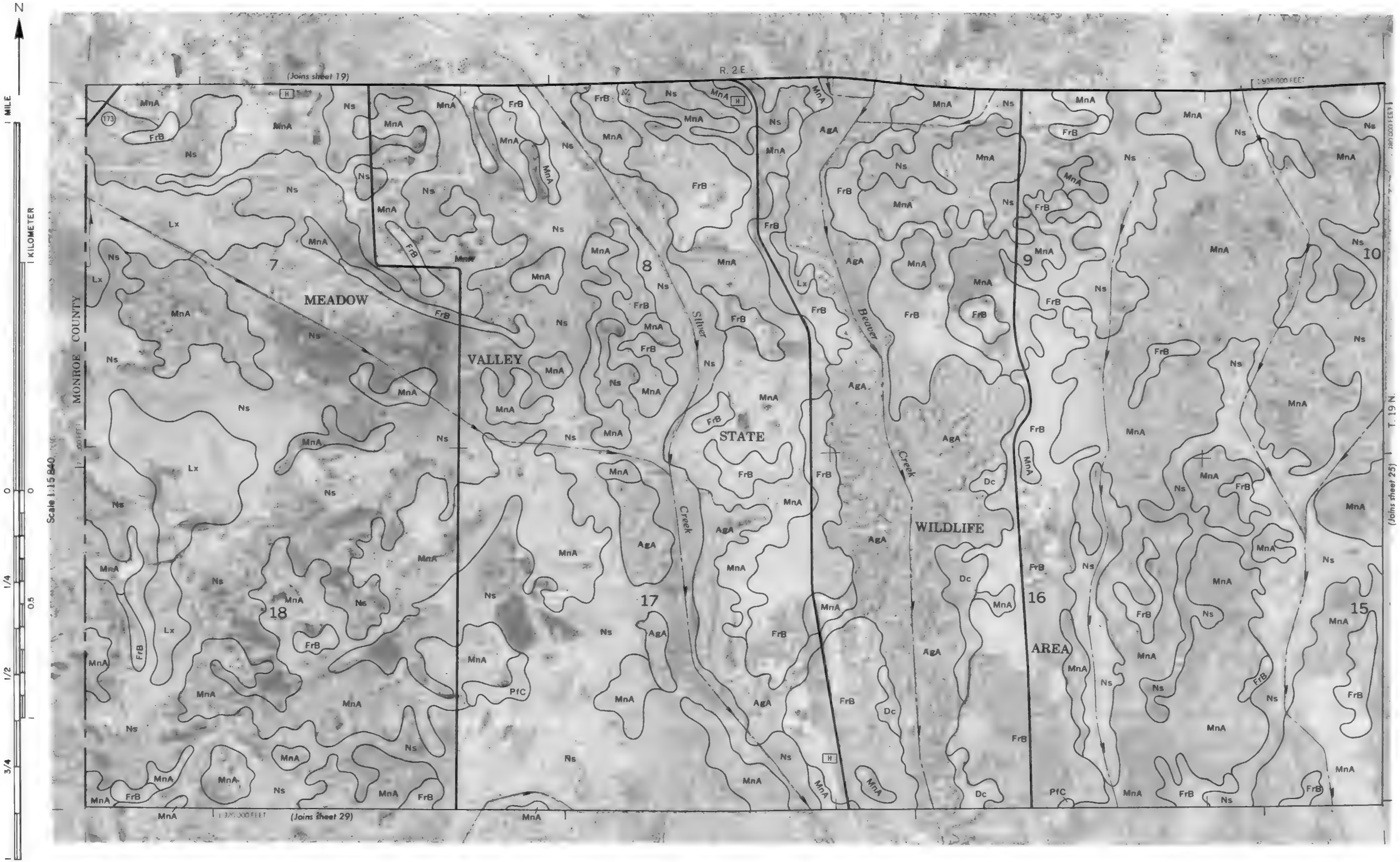

N
R. 2 E.
(Joins sheet 13)
(Joins sheet 20)
(Joins sheet 24)
1 920 000 FEET
1 935 000 FEET
785 000 FEET
JACKSON COUNTY
MONROE COUNTY
T. 20 N.
T. 19 N.
MEADOW
VALLEY
STATE
WILDLIFE
AREA
Beaver Creek
Beaver Flowage
Silver Creek
AVERY LATERAL
Mather
173
31
32
33
34
6
5
4
3
water
Ns
MnA
Ps
FrB
AgA
Dc
PfC
MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5

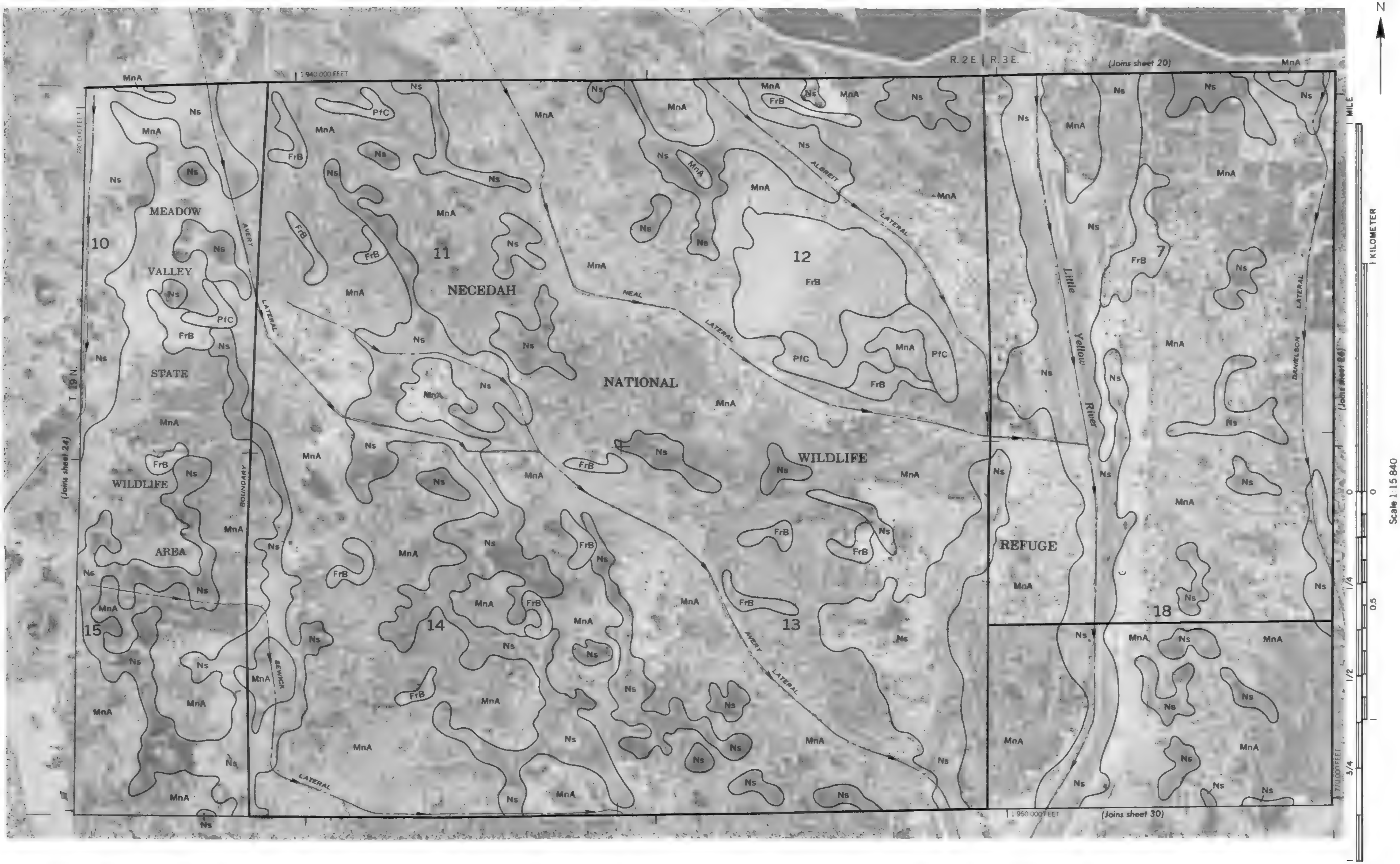

N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
(Joins sheet 14)
(Joins sheet 19)
(Joins sheet 21)
(Joins sheet 25)
R. 2 E.
R. 3 E.
T. 20 N.
T. 19 N.
1 950 000 FEET
MEADOW
VALLEY
STATE
WILDLIFE
AREA
NECEDAH
NATIONAL
WILDLIFE
REFUGE
WARD LATERAL
NEAL LATERAL
MC DOWELL LATERAL
AVERY LATERAL
ALBREIT LATERAL
DANIELSON LATERAL
BOUNDARY
West Branch
East Branch
Goose Pool
Sprague Mather Flowage
Little Yellow River
34
35
36
31
3
2
1
6

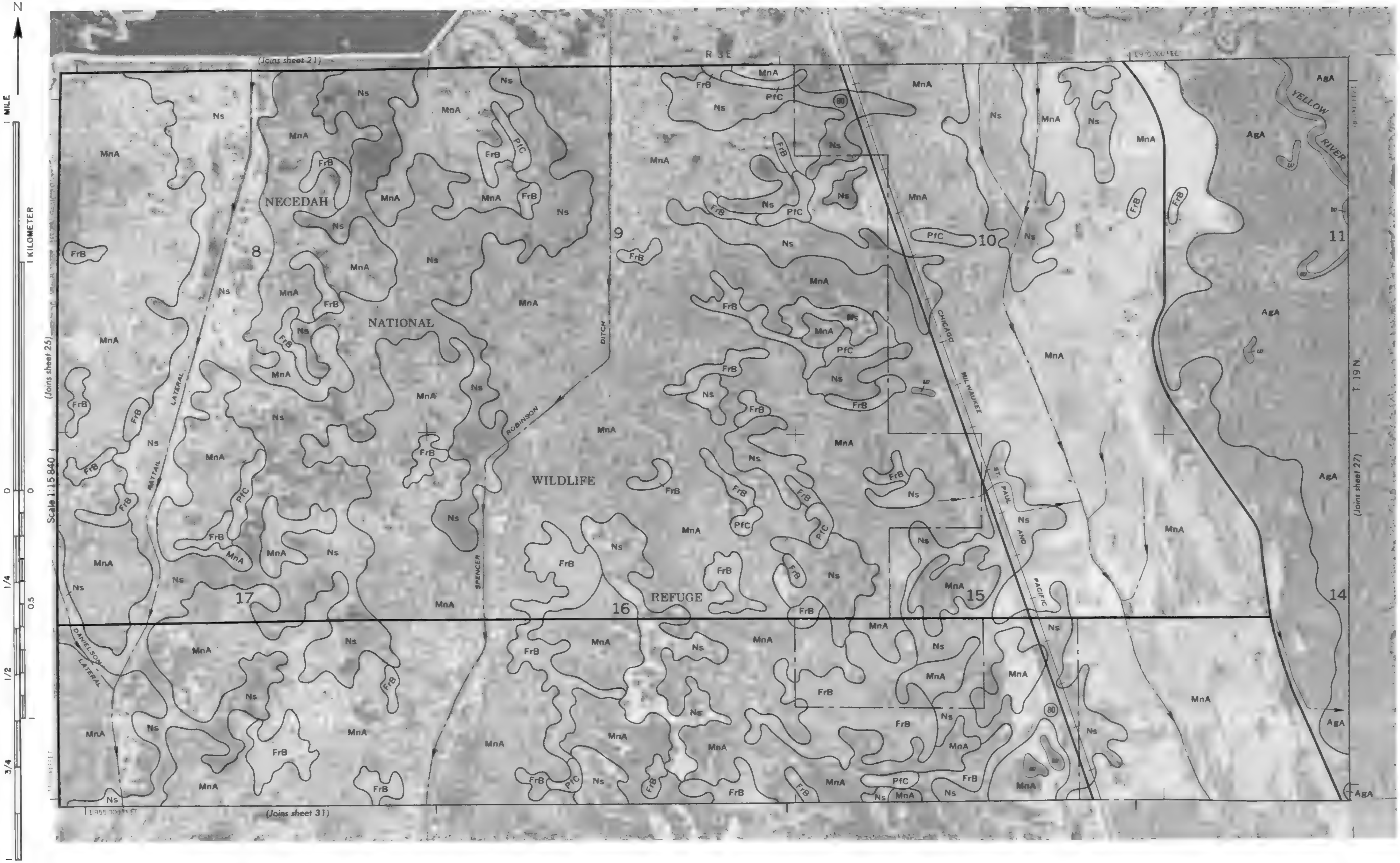

21
N
(Joins sheet 15)
(Joins sheet 19)
(Joins sheet 22)
(Joins sheet 26)
R. 3 E.
T. 19 N. | T. 20 N.
1 970 000 FEET
NECEDAH
NATIONAL
WILDLIFE
REFUGE
Sprague
Mather
Flowage
SPENCER
ROBINSON
DITCH
EAST BRANCH
BOUNDARY
CHICAGO MILWAUKEE ST PAUL AND PACIFIC
YELLOW RIVER
32
33
34
35
5
4
3
2
80
MnA
Ns
FrB
PfC
AgA
w
1 MILE
1/4
1/2
3/4
0
1 KILOMETER
0.5
Scale 1:15 840


N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5
1
(Joins sheet 16)
R. 3 E. | R. 4 E.
1 990 000 FEET
New Miner
(Joins sheet 21)
(Joins sheet 23)
(Joins sheet 27)
1 975 000 FEET
T. 19 N. | T. 20 N.
35
36
31
32
2
1
6
5
Cranberry Creek
SEARLES PRAIRIE CEMETERY
AgA
MnA
Ns
FrB


23
N
(Joins sheet 17)
R. 4 E.
New Miner
6
6
MnA
FrB
FrB
PfB
PfB
PfC
PfB
PfC
PfC
PfB
PfB
PfC
33
34
35
MnA
FrB
FrB
PfB
FrB
Petenwel Wilderness Park
FrB
T. 20 N.
T. 19 N.
(Joins sheet 22)
FrB
FrB
PfB
PfB
FrB
PETENWELL LAKE
ADAMS COUNTY
4
3
2
PfB
PfC
Halls Point
WISCONSIN RIVER
FrB
PfB
FrB
(Joins sheet 28)
MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1

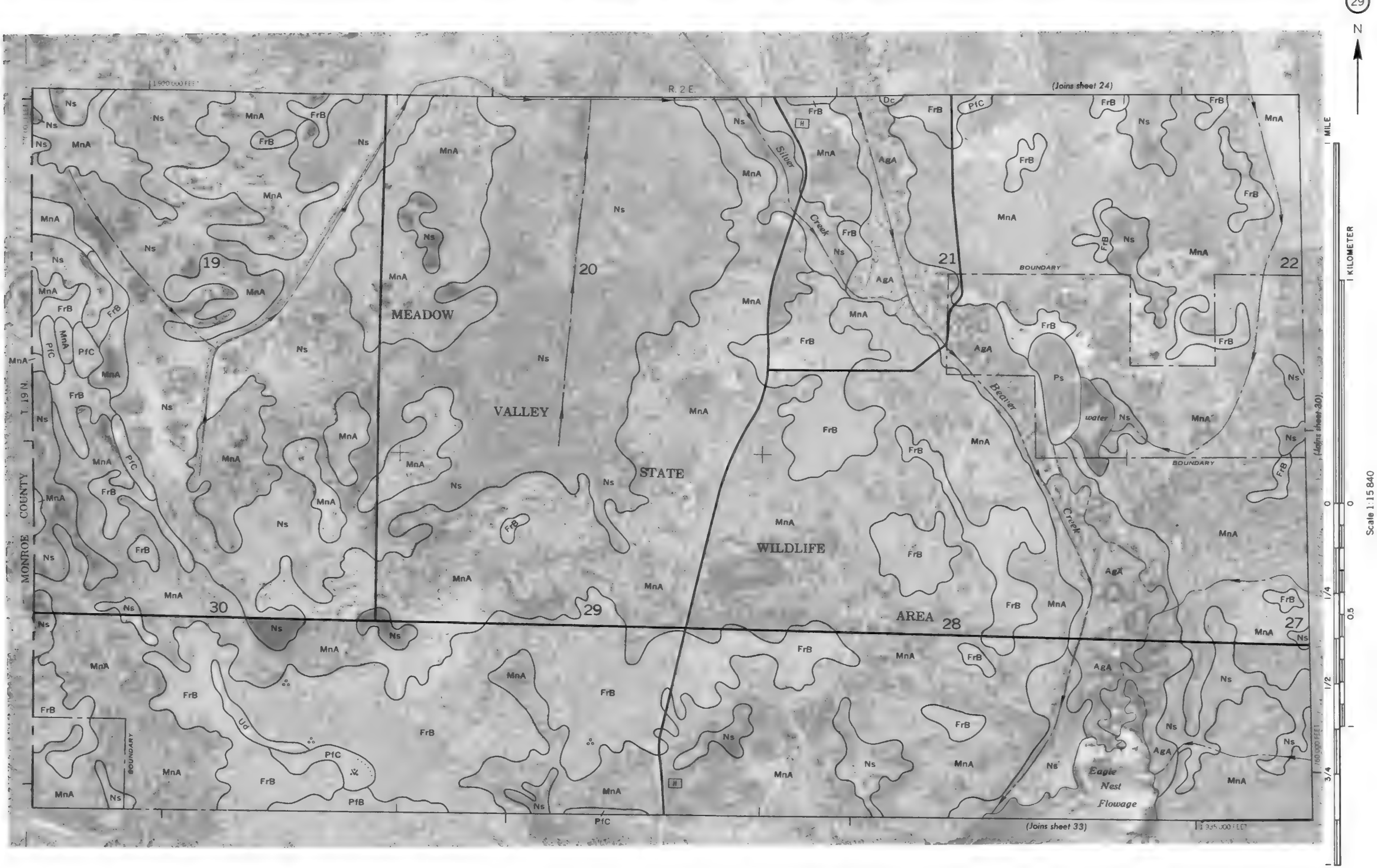

N
(Joins sheet 19)
R. 2 E.
MONROE COUNTY
MEADOW
VALLEY
STATE
WILDLIFE
AREA
Silver
Creek
Beaver
Creek
7
8
9
10
15
16
17
18
T. 19 N.
(Joins sheet 25)
(Joins sheet 29)
Scale 1:15 840
MILE
KILOMETER

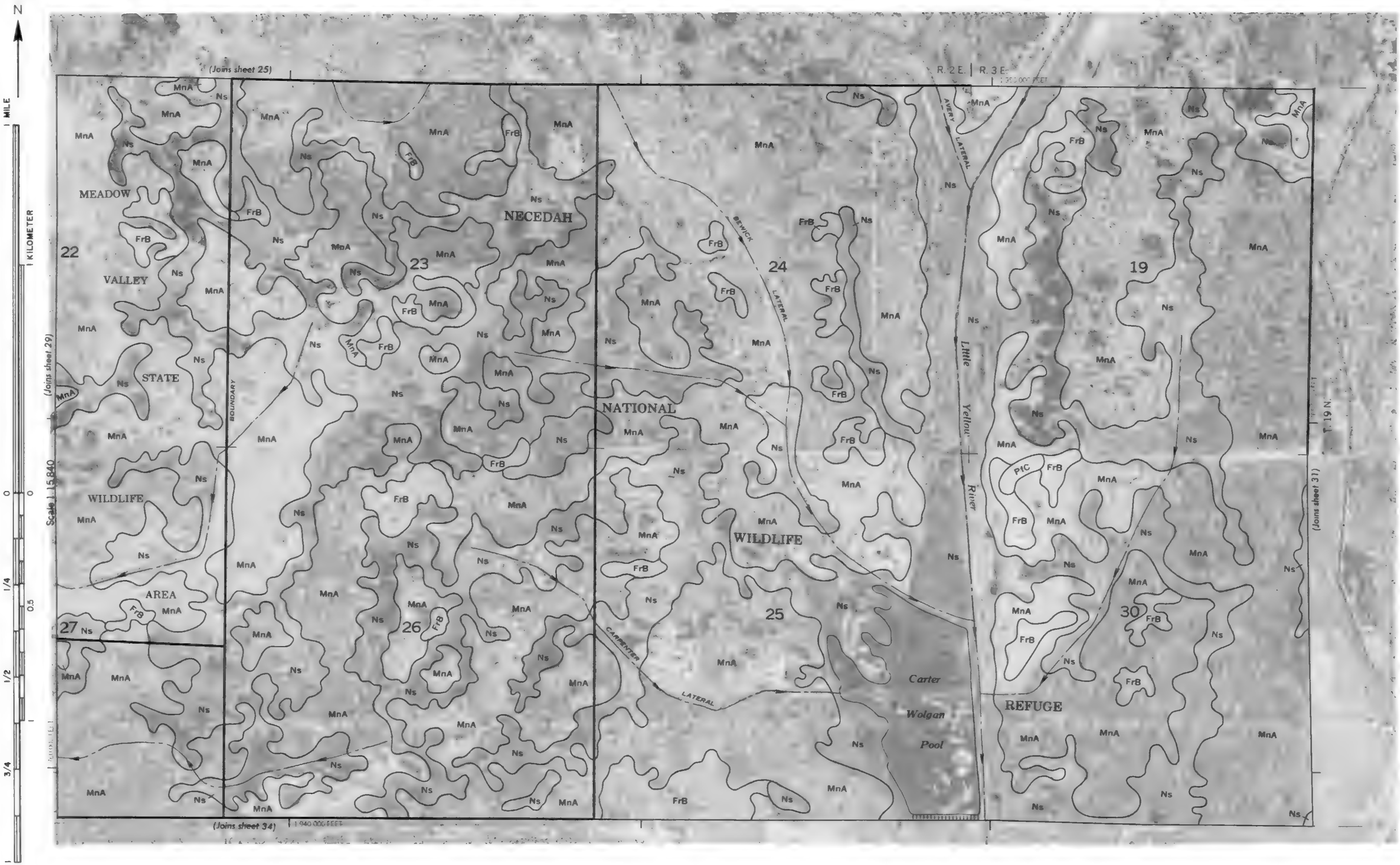

N
R. 2 E. | R. 3 E.
(Joins sheet 20)
1 940 000 FEET
780 000 FEET
T. 19 N.
(Joins sheet 24)
(Joins sheet 26)
(Joins sheet 30)
1 950 000 FEET
770 000 FEET
MEADOW
VALLEY
STATE
WILDLIFE
AREA
NECEDAH
NATIONAL
WILDLIFE
REFUGE
Little
Yellow
River
AVERY
BOUNDARY
LATERAL
NEAL
LATERAL
ALBREIT
LATERAL
AVERY
LATERAL
BEWICK
LATERAL
DANIELSON
LATERAL
10
11
12
7
15
14
13
18
MnA
Ns
FrB
PfC
MILE
1 KILOMETER
Scale 1:15 840
0
1/4
0.5
1/2
3/4


N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
(Joins sheet 21)
(Joins sheet 25)
(Joins sheet 27)
(Joins sheet 31)
R 3 E.
T. 19 N.
NECEDAH
NATIONAL
WILDLIFE
REFUGE
8
9
10
11
14
15
16
17
YELLOW RIVER
CHICAGO MILWAUKEE ST. PAUL AND PACIFIC
80
DITCH
ROBINSON
SPENCER
LATERAL
RATTAIL
DANIELSON LATERAL
MnA
Ns
FrB
PfC
AgA
w


N
R. 3 E. | R. 4 E.
(Joins sheet 22)
(Joins sheet 26)
(Joins sheet 28)
(Joins sheet 32)
T. 19 N.
ZION CEMETERY
Cranberry Creek
YELLOW RIVER
water
WEST PETENWELL DITCH
PETENWELL LAKE
WISCONSIN RIVER
11
12
7
8
14
13
18
17
AgA
MnA
FrB
Ps
MjA
1 990 000 FEET
770 000 FEET
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5


N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840
(Joins sheet 23)
(Joins sheet 27)
R. 4 E.
T. 19 N.
FrB
PfB
9
10
11
15
16
PETENWELL LAKE
WISCONSIN RIVER
ADAMS COUNTY


29
N
(Joins sheet 24)
R. 2 E.
T. 19 N.
MONROE COUNTY
MEADOW
VALLEY
STATE
WILDLIFE
AREA
19
20
21
22
30
29
28
27
Silver Creek
Beaver Creek
Eagle Nest Flowage
water
BOUNDARY
(Joins sheet 30)
(Joins sheet 33)
1 920 000 FEET
1 935 000 FEET
160 000 FEET
Ns
MnA
FrB
PfC
PfB
AgA
Ps
Ud
Dc
MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840

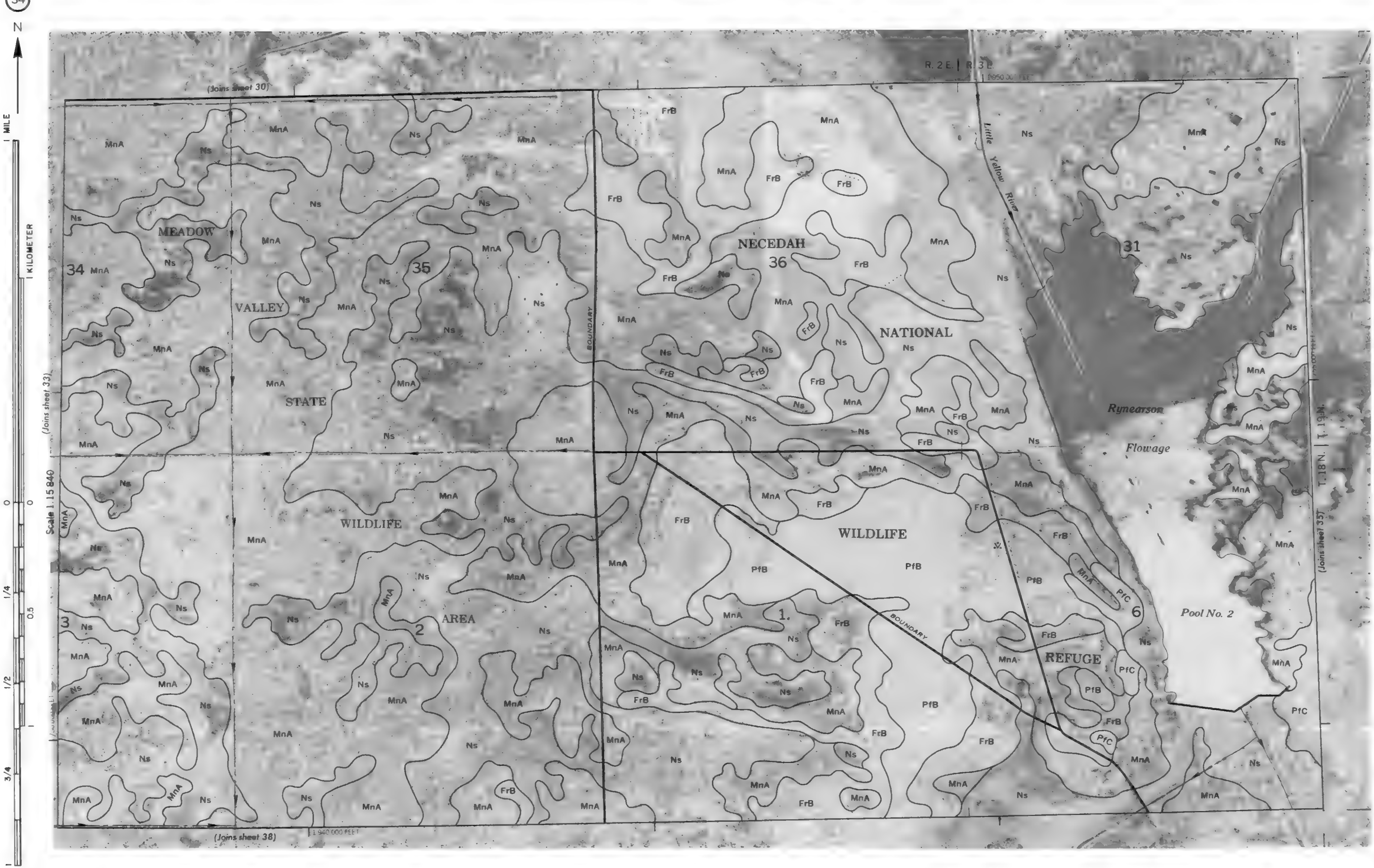

N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
0.5
1/2
3/4
1
(Joins sheet 25)
(Joins sheet 29)
(Joins sheet 31)
(Joins sheet 34)
R. 2 E.
R. 3 E.
1 940 000 FEET
T. 19 N.
MEADOW
VALLEY
STATE
WILDLIFE
AREA
NECEDAH
NATIONAL
WILDLIFE
REFUGE
BOUNDARY
BEWICK LATERAL
AVERY LATERAL
CARPENTER LATERAL
Little Yellow River
Carter Wolgan Pool
22
23
24
19
27
26
25
30
MnA
Ns
FrB
PfC


N
R. 3 E.
(Joins sheet 26)
(Joins sheet 30)
(Joins sheet 32)
(Joins sheet 35)
T. 19 N.
1 955 000 FEET
1 970 000 FEET
760 000 FEET
765 000 FEET
NECEDAH
NATIONAL
WILDLIFE
REFUGE
SPENCER
ROBINSON
DITCH
RATTAIL
LATERAL
CHICAGO
MILWAUKEE
ST. PAUL
AND
PACIFIC
20
21
22
23
26
27
28
29
1 MILE
1 KILOMETER
Scale 1:15 840

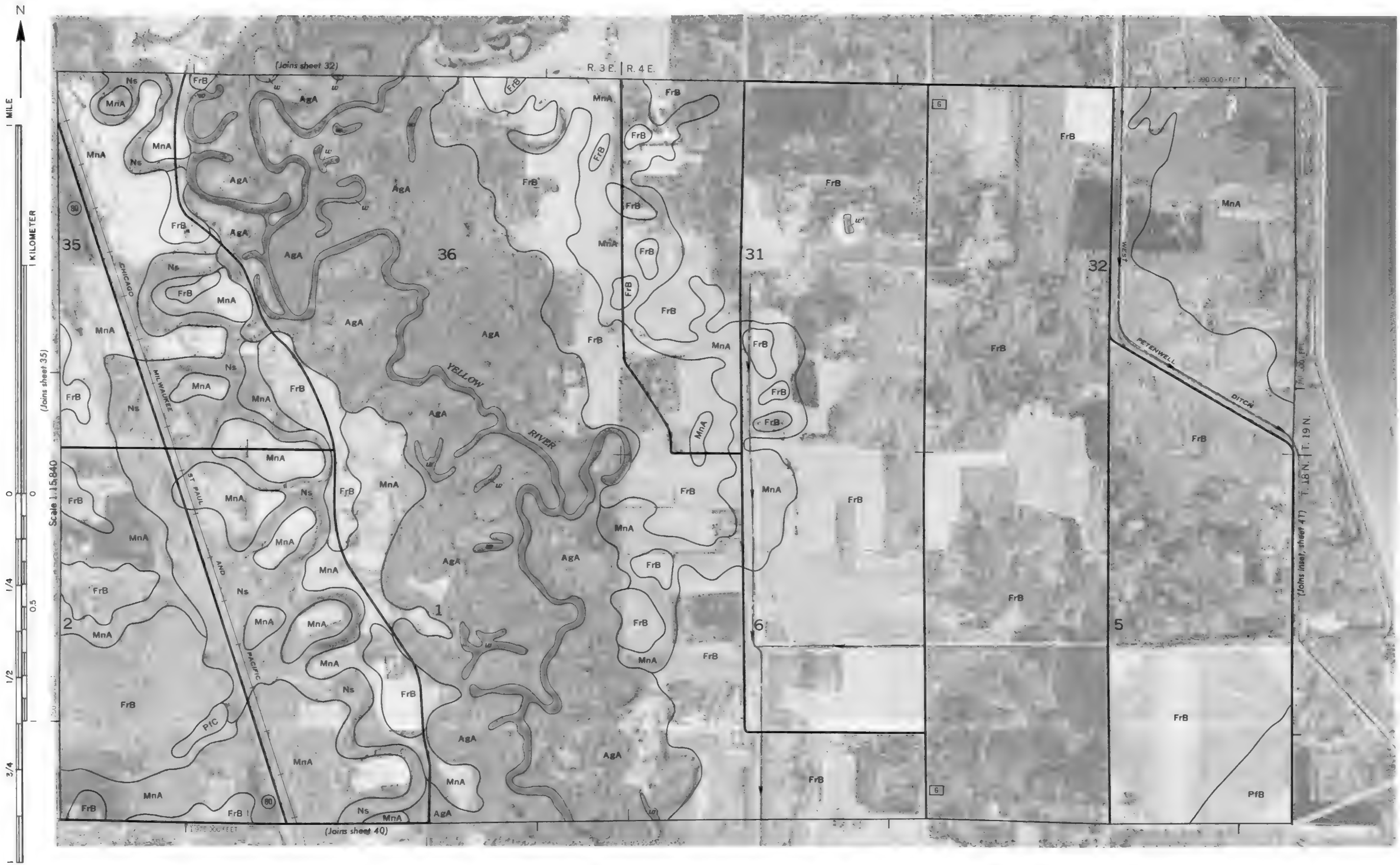

32
N
1 MILE
1 KILOMETER
Scale 1:15 840
(Joins sheet 27)
R. 3 E. | R. 4 E.
(Joins sheet 31)
(Joins sheet 36)
(Joins inset, sheet 41)
T. 19 N.
ADAMS COUNTY
PETENWELL LAKE
WISCONSIN RIVER
YELLOW RIVER
WEST PETENWELL DITCH
23
24
19
20
26
25
30
29
AgA
MnA
FrB
MeA
Ns
Ud
w

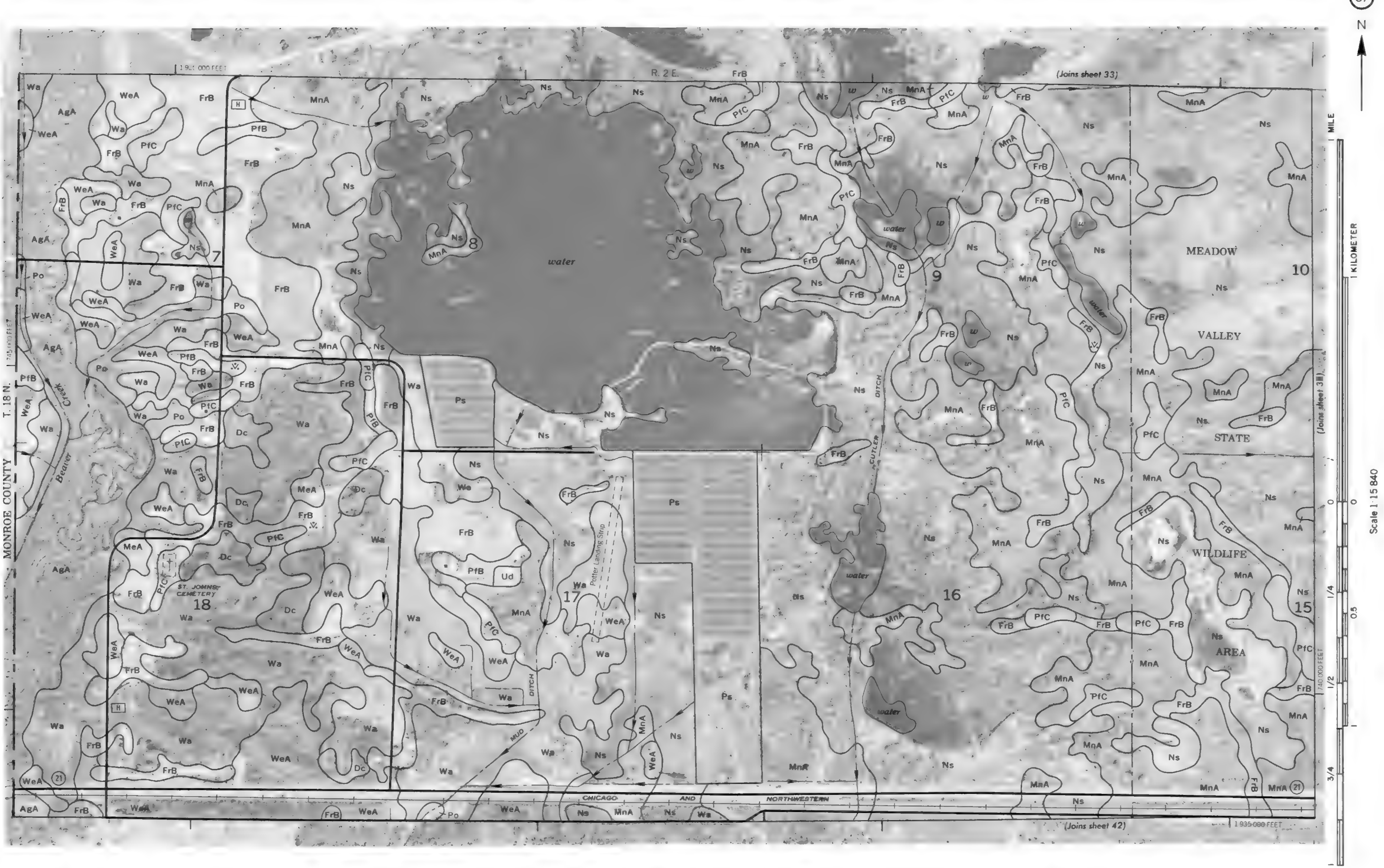
33


N
R. 2 E.
1 920 000 FEET
(Joins sheet 29)
(Joins sheet 34)
(Joins sheet 37)
1 935 000 FEET
750 000 FEET
T. 19 N.
T. 18 N.
MONROE COUNTY
MEADOW VALLEY STATE WILDLIFE AREA
Eagle Nest Flowage
Beaver Creek
Creek
Beaver
CUTLER DITCH
water
31
32
33
34
6
5
4
3
MnA
Ns
FrB
PfC
PfB
BpF
AgA
WeA
MaA
Wa
Ps
Ud
MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840

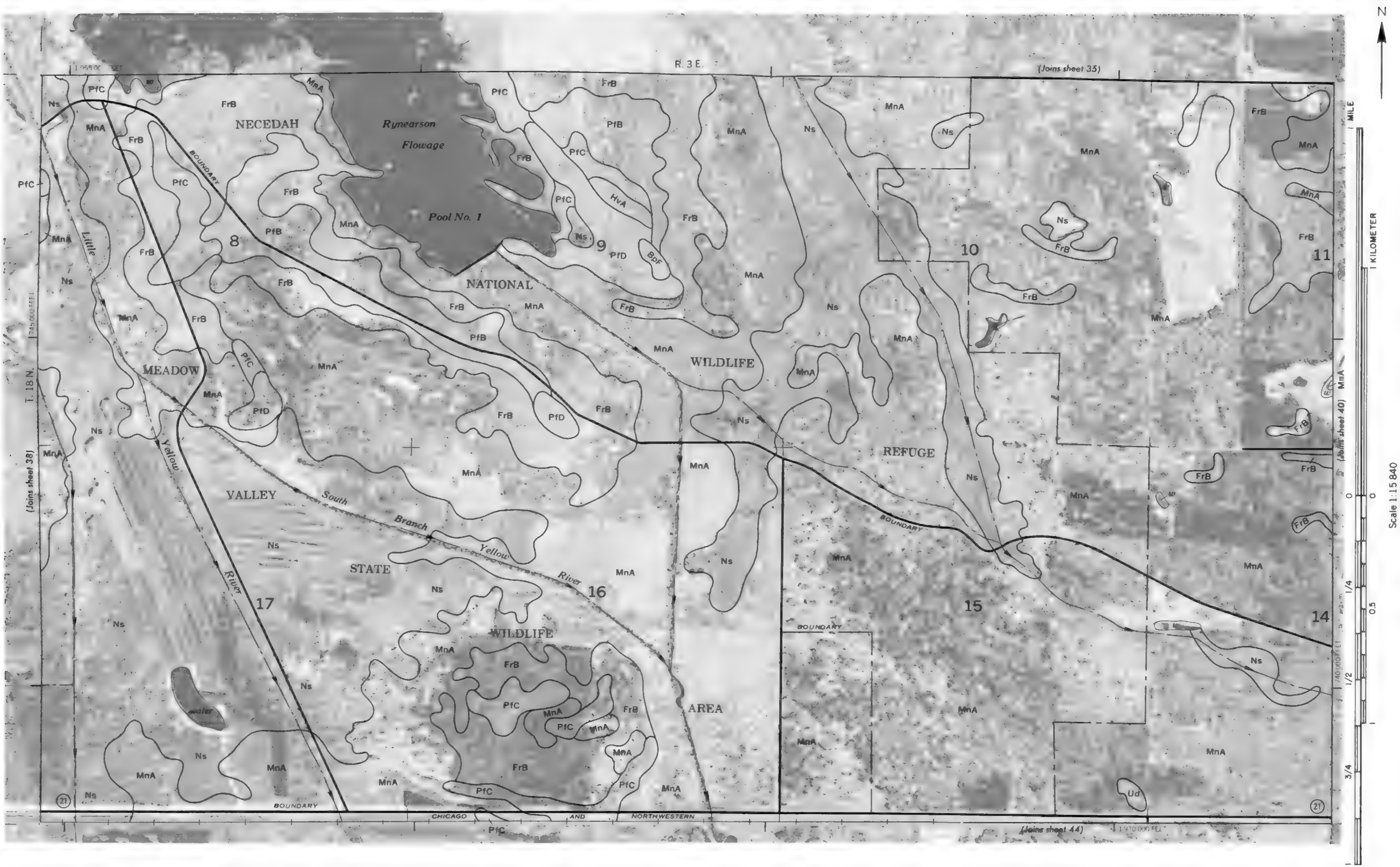

34
N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0
0.5
Scale 1:15 840
(Joins sheet 30)
(Joins sheet 33)
(Joins sheet 35)
(Joins sheet 38)
R. 2 E. | R. 3 E.
T. 18 N. | T. 19 N.
1 950 000 FEET
1 940 000 FEET
MEADOW
VALLEY
STATE
WILDLIFE
AREA
NECEDAH
NATIONAL
WILDLIFE
REFUGE
BOUNDARY
Little Yellow River
Rynearson
Flowage
Pool No. 2
34
35
36
31
3
2
1
6
MnA
Ns
FrB
PfB
PfC

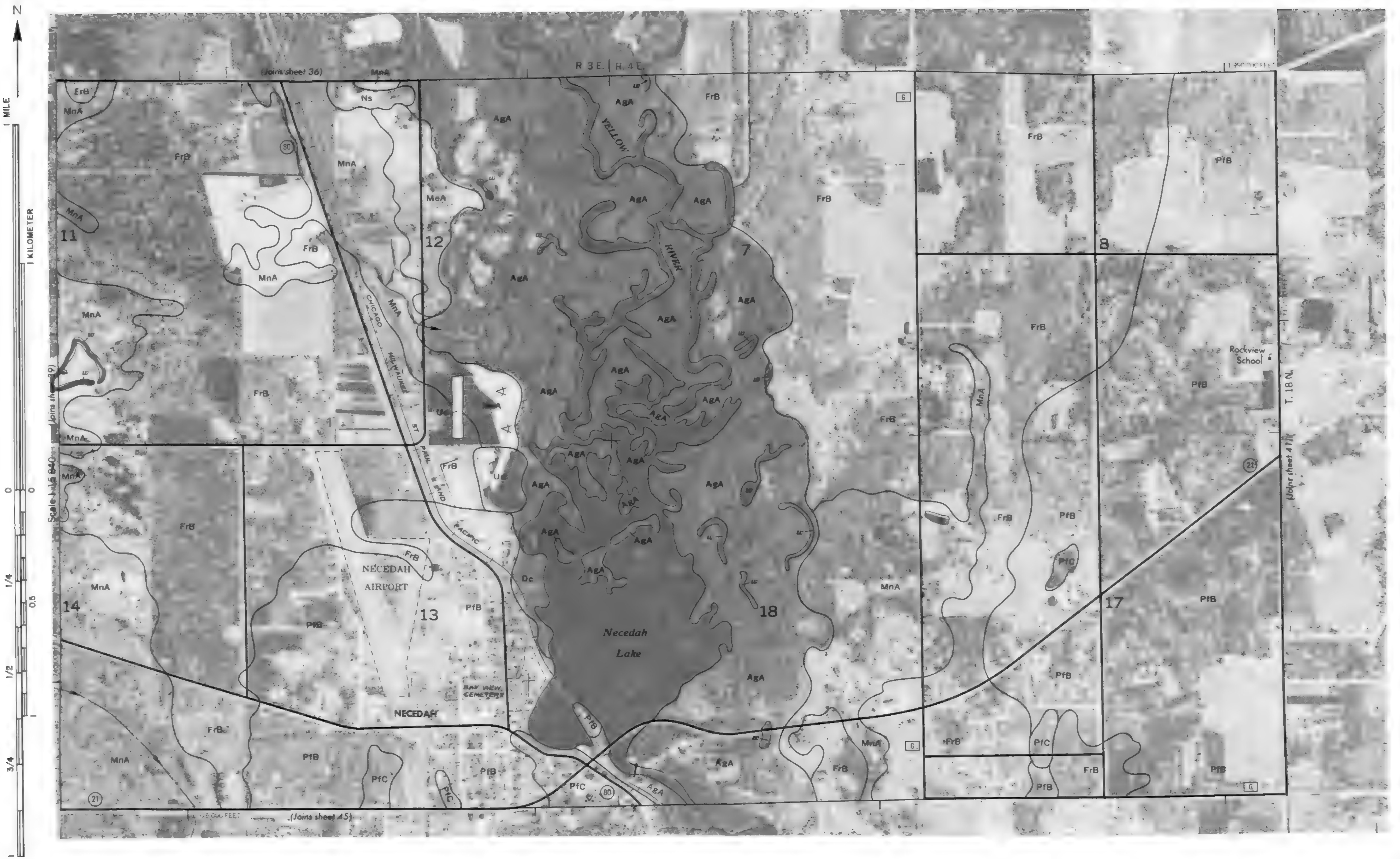

35
N
R. 3 E.
(Joins sheet 31)
(Joins sheet 36)
(Joins sheet 39)
(Joins sheet 34)
T. 19 N.
T. 18 N.
NECEDAH
NATIONAL
WILDLIFE
REFUGE
Rynearson
Flowage
Pool No. 1
Pool No. 2
SPENCER ROBINSON DITCH
RATTAIL LATERAL
32
33
34
35
5
4
3
2
80
MnA
Ns
FrB
PfC
MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0.5

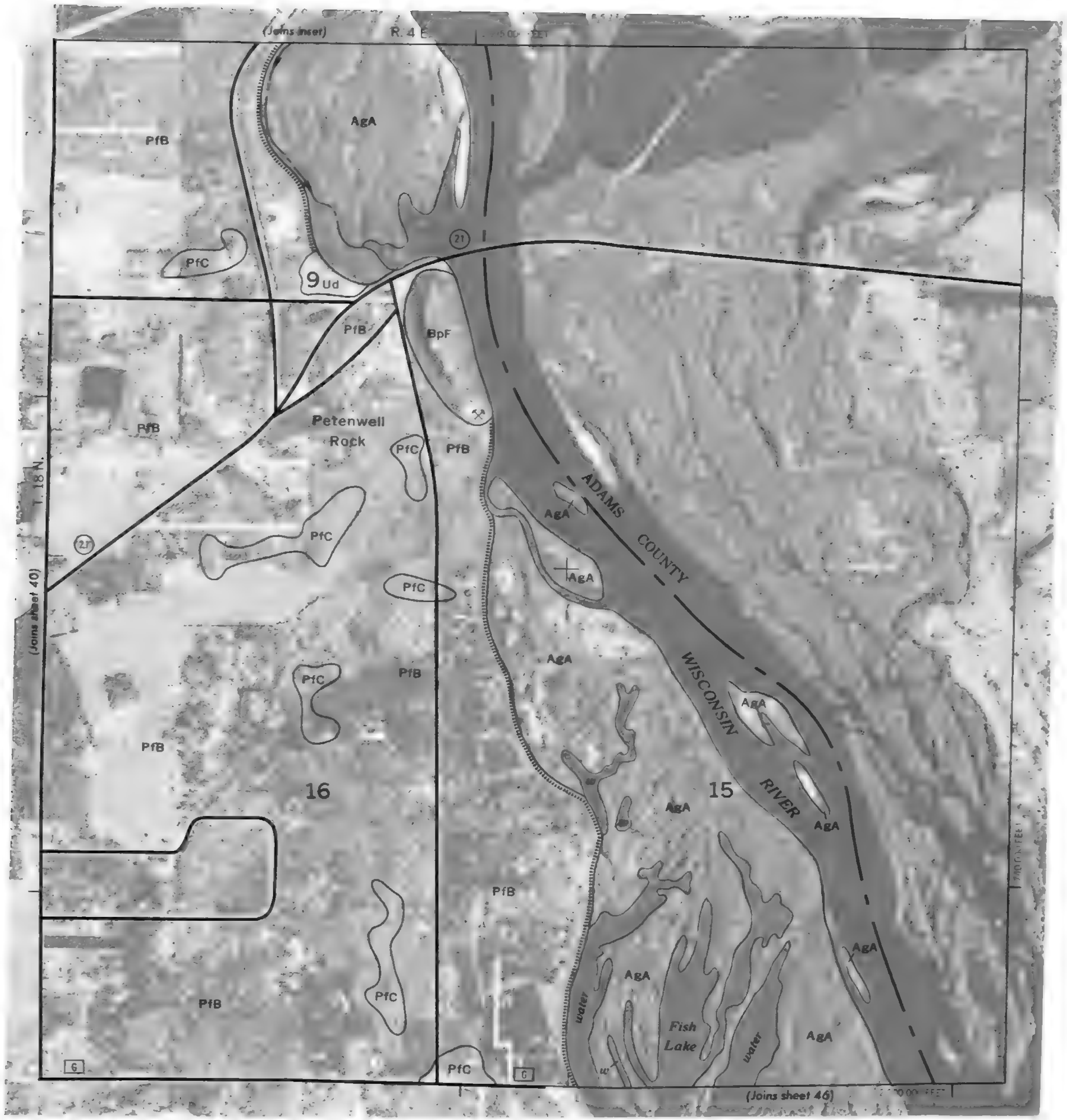

N
MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0.5
(Joins sheet 32)
R. 3 E. | R. 4 E.
(Joins sheet 35)
(Joins sheet 40)
(Joins inset, sheet 41)
T. 19 N.
T. 18 N.
35
36
31
32
2
1
6
5
CHICAGO
MILWAUKEE
ST PAUL
AND
PACIFIC
YELLOW
RIVER
WEST
PETENWELL
DITCH
80
6
AgA
MnA
FrB
Ns
PfC
PfB
w

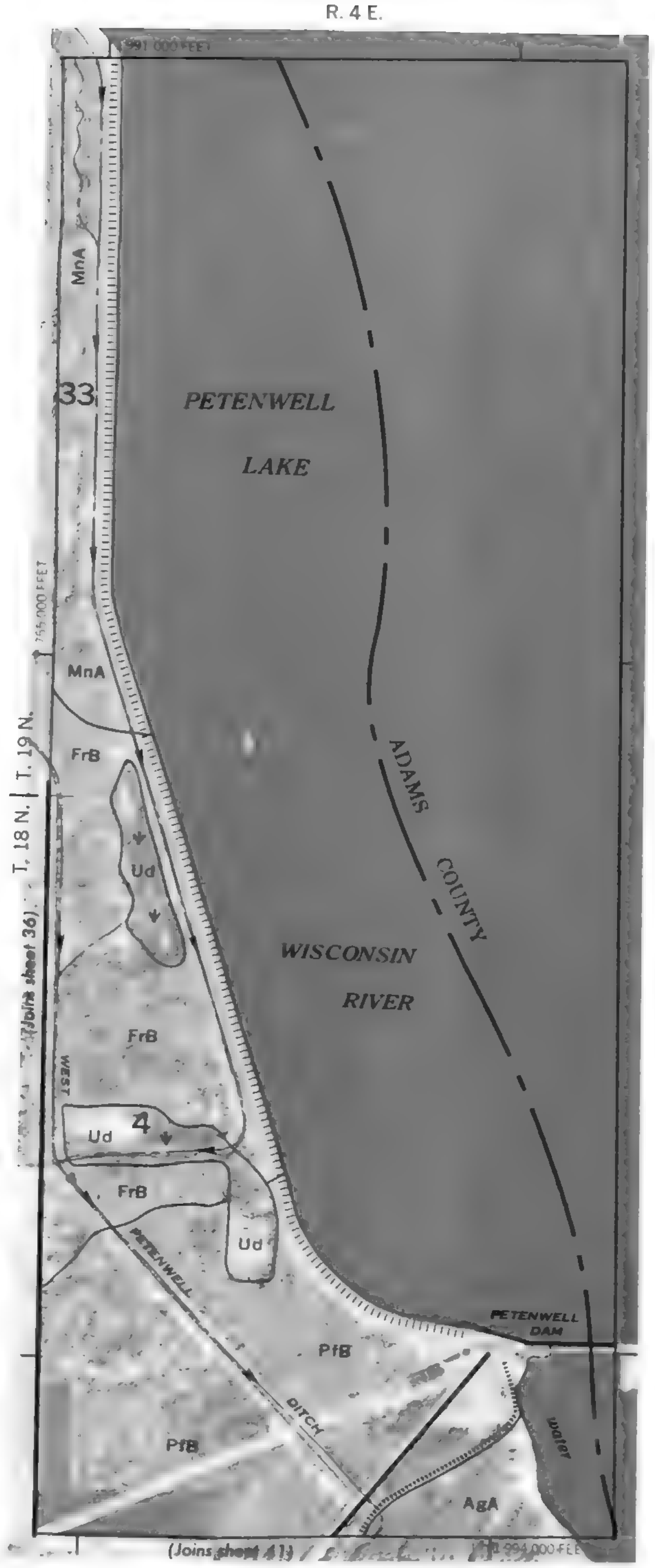

(Joins sheet 33)
R. 2 E.
T. 18 N.
MONROE COUNTY
Beaver Creek
MEADOW VALLEY STATE WILDLIFE AREA
CUTLER DITCH
MUD DITCH
DITCH
Potter Landing Strip
ST. JOHNS CEMETERY
CHICAGO AND NORTHWESTERN
(Joins sheet 38)
(Joins sheet 42)
1 935 000 FEET
740 000 FEET
water
7
8
9
10
15
16
17
18
N
1 MILE
1 KILOMETER
Scale 1:15 840
AgA
Dc
FrB
MeA
MnA
Ns
PfB
PfC
Po
Ps
Ud
Wa
WeA

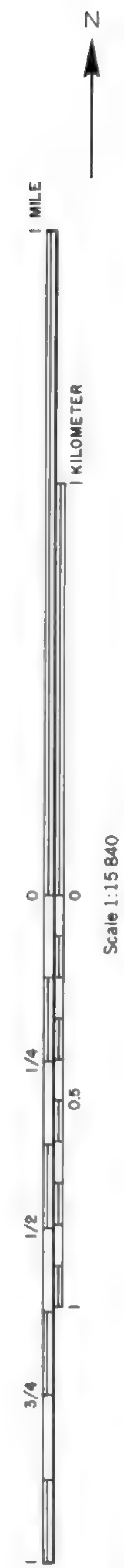

N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
(Joins sheet 34)
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 43)
R. 2 E. | R. 3 E.
T. 18 N.
MEADOW
VALLEY
STATE
WILDLIFE
AREA
Suk and Cerney
Flowage
BOUNDARY
CHICAGO AND NORTHWESTERN
10
11
12
7
13
14
15
18
21


39
N
R. 3 E.
(Joins sheet 35)
(Joins sheet 38)
(Joins sheet 40)
(Joins sheet 44)
T. 18 N.
NECEDAH
NATIONAL
WILDLIFE
REFUGE
MEADOW
VALLEY
STATE
WILDLIFE
AREA
Rynearson
Flowage
Pool No. 1
Little
Yellow
River
South
Branch
Yellow
River
BOUNDARY
CHICAGO
AND
NORTHWESTERN
8
9
10
11
14
15
16
17
21
water
MnA
Ns
PfC
FrB
PfB
PfD
HvA
BpF
Ud
MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
1

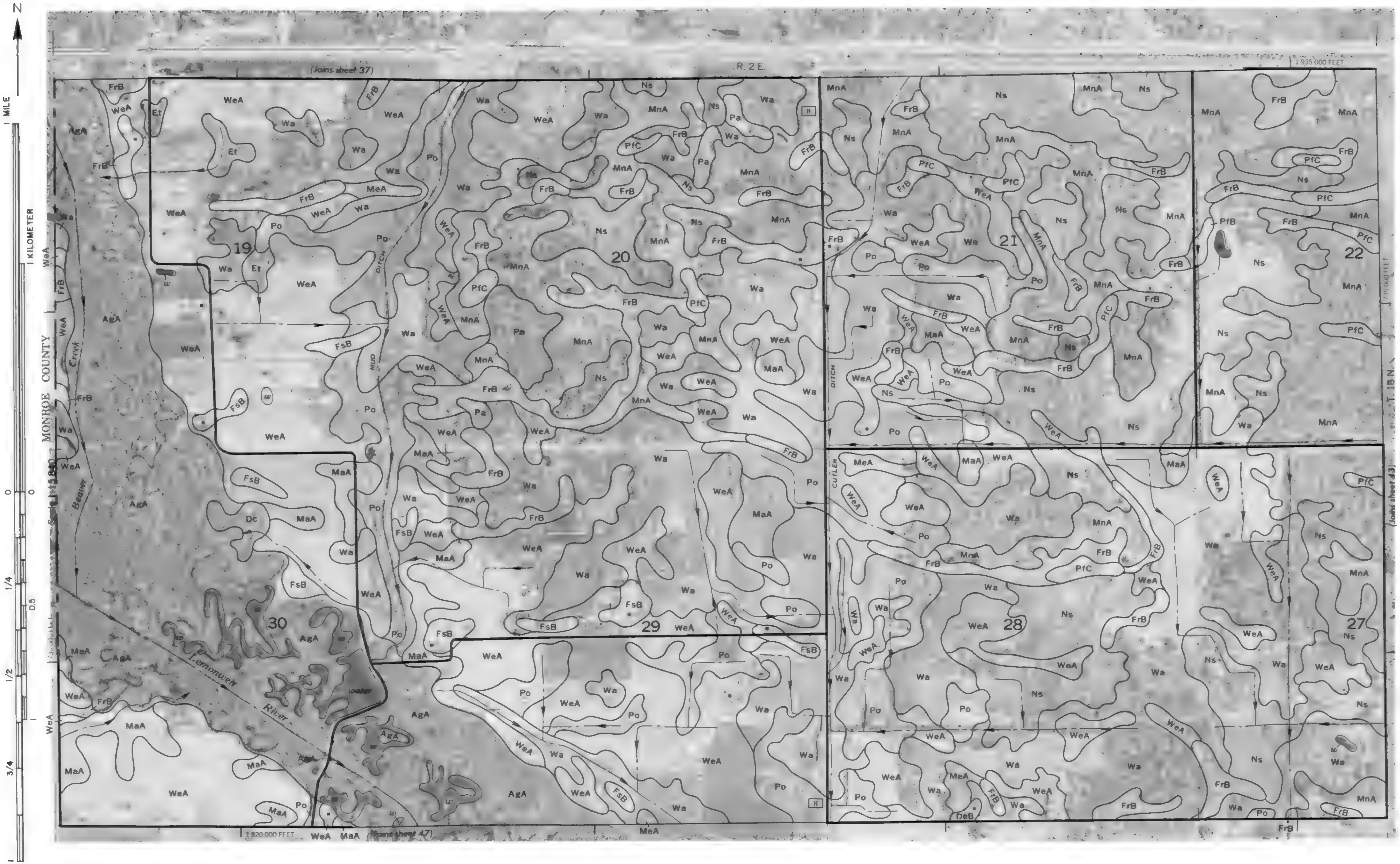

N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840
(Joins sheet 36)
(Joins sheet 39)
(Joins sheet 41)
(Joins sheet 45)
R. 3 E. | R. 4 E.
T. 18 N.
YELLOW
RIVER
CHICAGO
MILWAUKEE
ST. PAUL
AND
PACIFIC
NECEDAH
AIRPORT
NECEDAH
BAY VIEW
CEMETERY
Necedah
Lake
Rockview
School
11
12
7
8
14
13
18
17
80
21
6
FrB
MnA
Ns
MeA
AgA
Uc
Dc
PfB
PfC
w

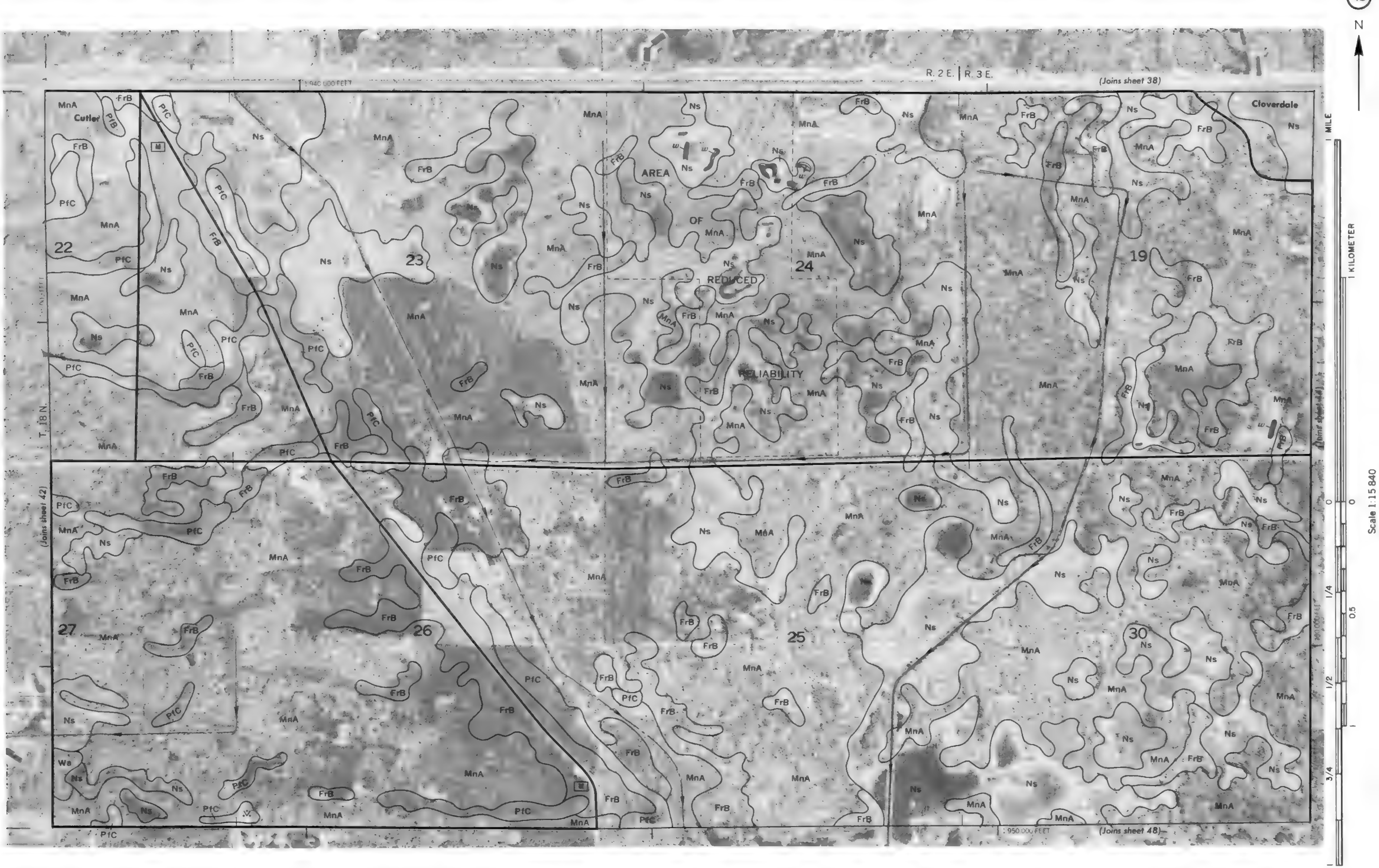

(Joins inset)
R. 4 E.
AgA
PfB
PfC
9
Ud
21
PfB
BpF
Petenwell
Rock
PfC
PfB
T. 18 N.
PfC
PfC
ADAMS
COUNTY
AgA
AgA
(Joins sheet 40)
AgA
PfC
PfB
WISCONSIN
AgA
PfB
16
15
RIVER
AgA
AgA
PfB
AgA
PfC
PfB
water
Fish
Lake
water
AgA
AgA
PfC
(Joins sheet 46)

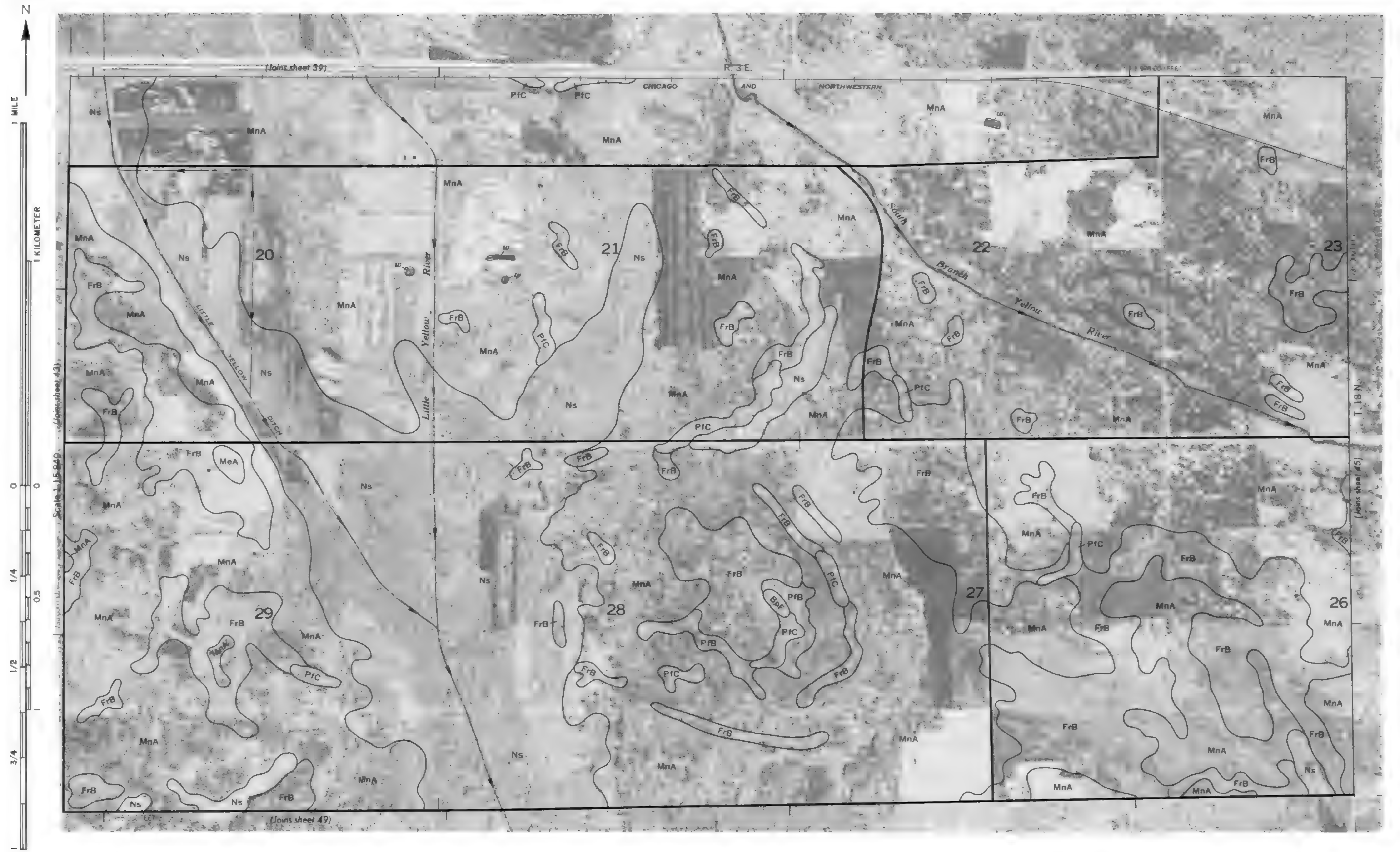

R. 4 E.
MnA
33
PETENWELL
LAKE
MnA
T. 19 N.
T. 18 N.
FrB
ADAMS
COUNTY
Ud
(Joins sheet 36)
WISCONSIN
RIVER
FrB
WEST
4
Ud
FrB
Ud
PETENWELL
PETENWELL
DAM
PfB
DITCH
PfB
water
AgA
(Joins sheet 41)
3000 AND 5000-FOOT GRID TICKS

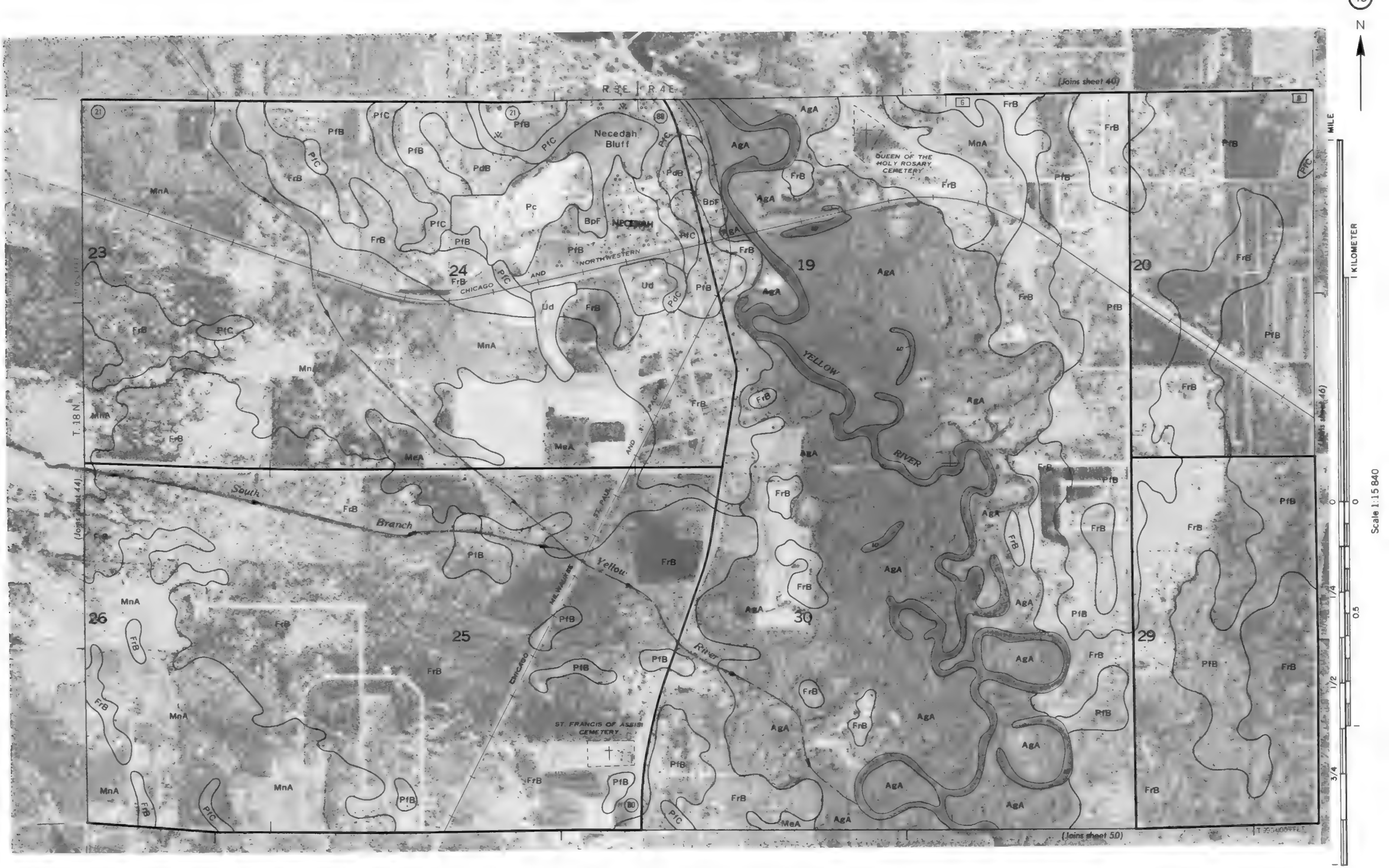

N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5

42

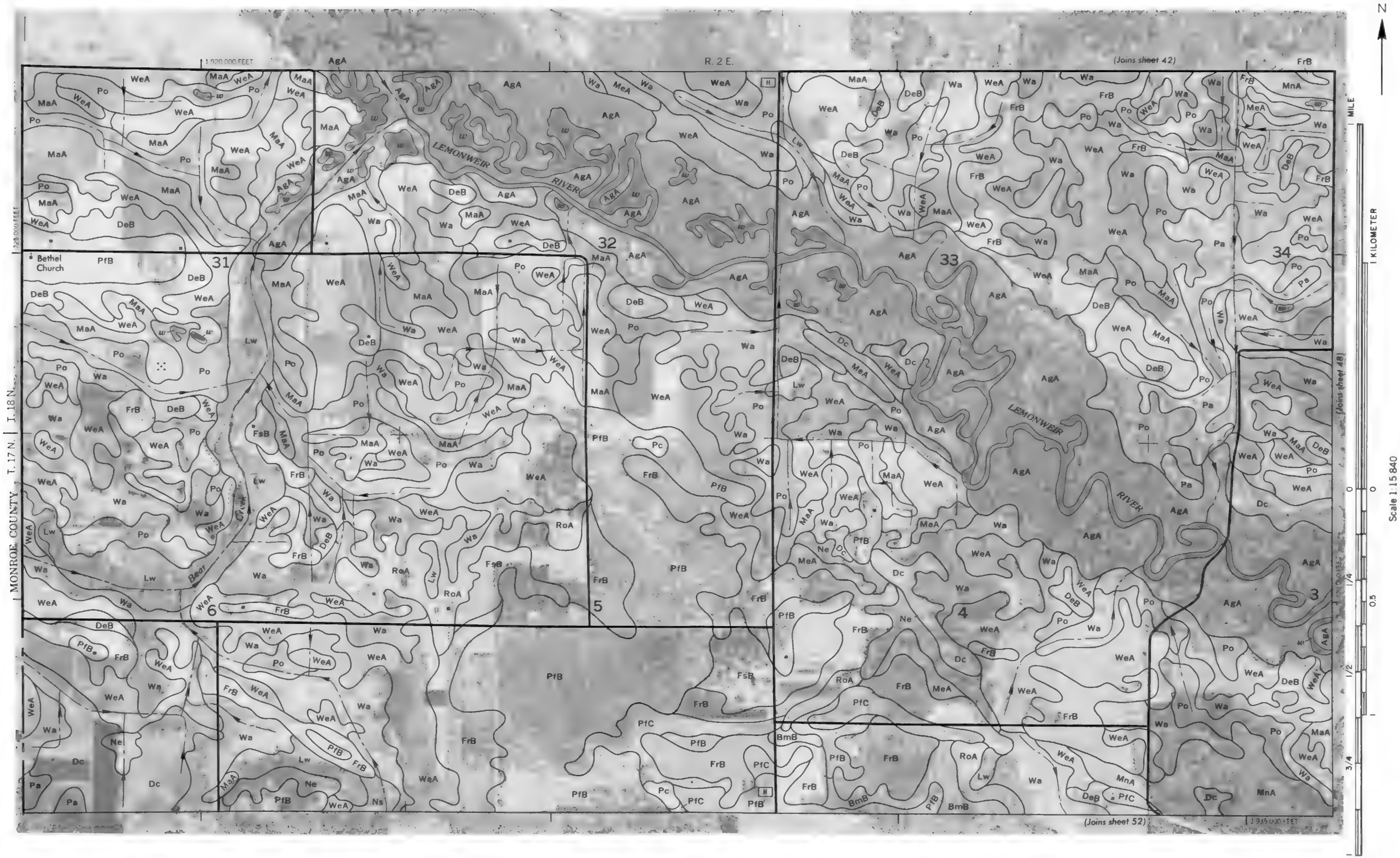

N
1 MILE
1 KILOMETER
0
1/4
0.5
1/2
3/4
1
(Joins sheet 37)
R. 2 E.
1 935 000 FEET
T. 18 N.
(Joins sheet 43)
(Joins sheet 47)
1 920 000 FEET
MONROE COUNTY
Beaver Creek
Lemonweir River
MUD DITCH
CUTLER DITCH
19
20
21
22
27
28
29
30
water

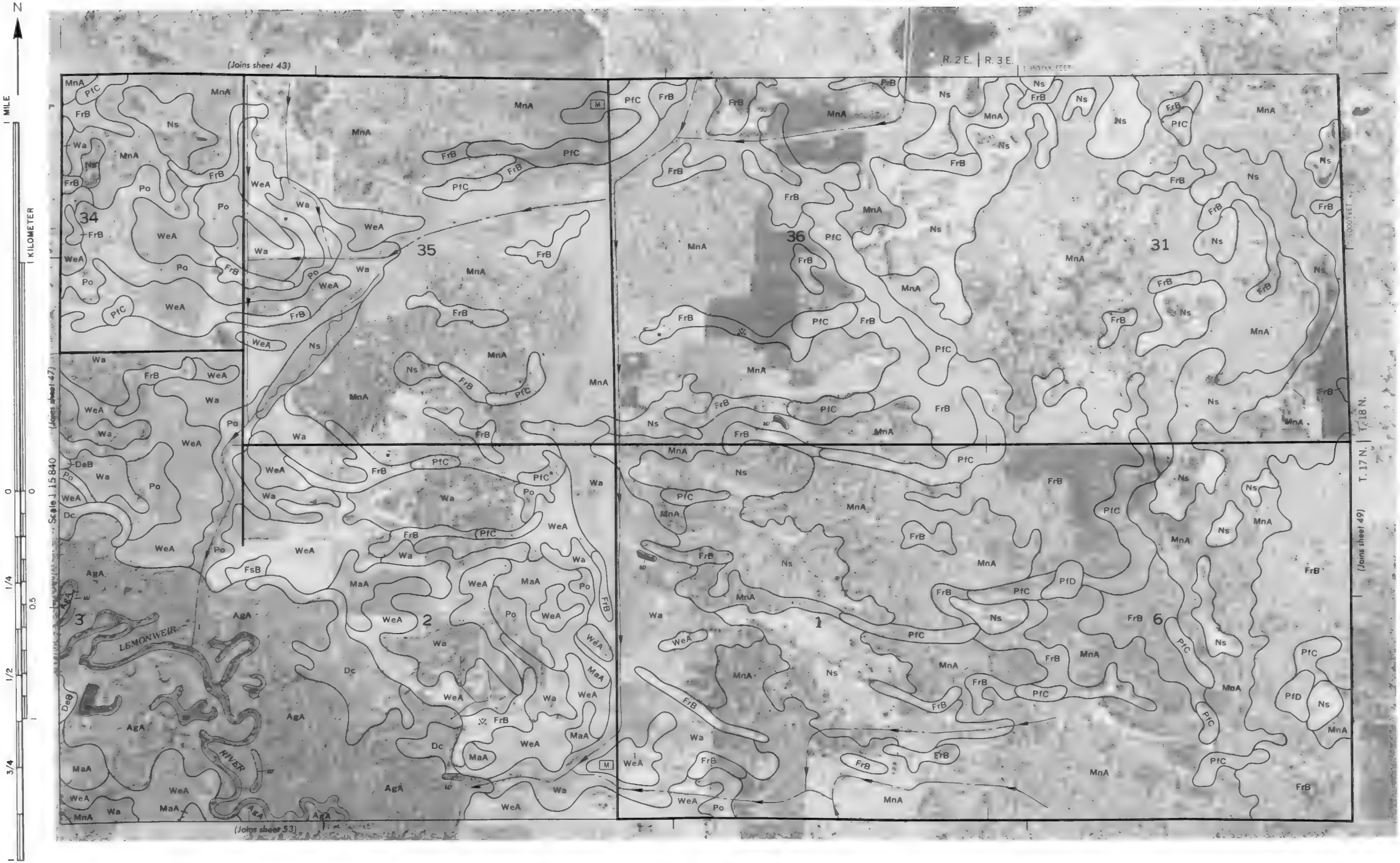

43
N
R. 2 E. | R. 3 E.
(Joins sheet 38)
(Joins sheet 42)
(Joins sheet 44)
(Joins sheet 48)
T. 18 N.
1 940 000 FEET
950 000 FEET
Cutler
Cloverdale
AREA OF REDUCED RELIABILITY
22
23
24
19
27
26
25
30
MnA
Ns
FrB
PfC
PfB
Wa
MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0.5


N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
(Joins sheet 39)
(Joins sheet 43)
(Joins sheet 45)
(Joins sheet 49)
R. 3 E.
T. 18 N.
CHICAGO AND NORTHWESTERN
LITTLE YELLOW DITCH
Little Yellow River
South Branch Yellow River
20
21
22
23
26
27
28
29
Ns
MnA
PfC
FrB
MeA
BpF
PfB

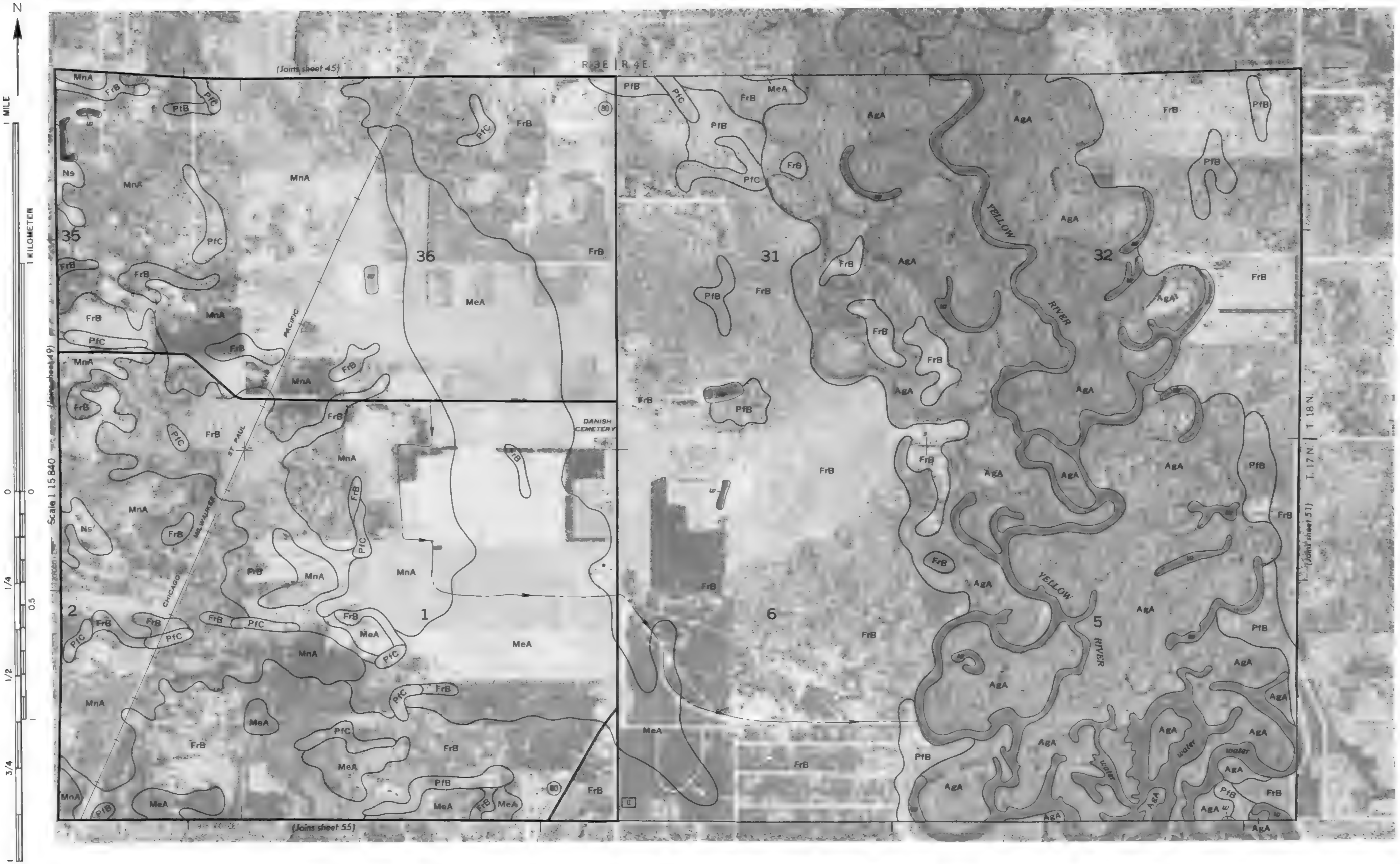

45
N
(Joins sheet 40)
(Joins sheet 50)
(Joins sheet 44)
(Joins sheet 46)
R. 3 E.
R. 4 E.
T. 18 N.
Necedah Bluff
NECEDAH
QUEEN OF THE HOLY ROSARY CEMETERY
ST. FRANCIS OF ASSISI CEMETERY
CHICAGO AND NORTHWESTERN
CHICAGO MILWAUKEE ST. PAUL AND PACIFIC
YELLOW RIVER
Yellow River
South Branch
23
24
19
20
26
25
30
29
MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0.5
PfB
PfC
PdB
Pc
BpF
FrB
MnA
MeA
AgA
Ud


N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840
(Joins sheet 47)
(Joins sheet 45)
(Joins sheet 51)
R. 4 E.
T. 18 N.
21
22
26
27
28
Fish Lake
WISCONSIN RIVER
ADAMS COUNTY
CASTLE ROCK LAKE
CHICAGO AND NORTHWESTERN
PfB
PfC
AgA
BpF
Ud
FrB
MnA

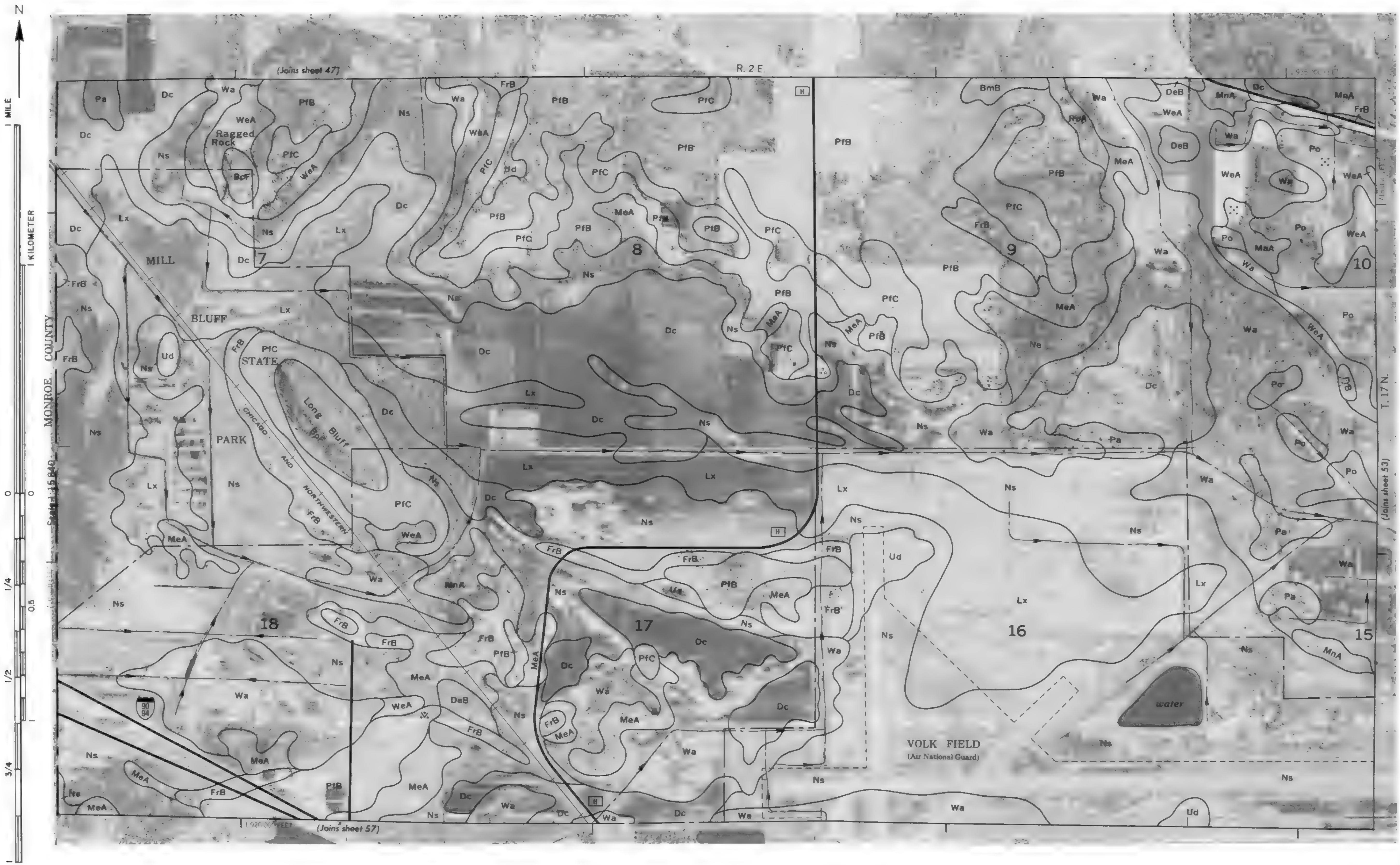

N
1,920,000 FEET
R. 2 E.
(Joins sheet 42)
(Joins sheet 48)
(Joins sheet 52)
1 935 000 FEET
720 000 FEET
T. 18 N.
T. 17 N.
MONROE COUNTY
LEMONWEIR RIVER
LEMONWEIR RIVER
Bear Creek
Bethel Church
31
32
33
34
6
5
4
3
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1

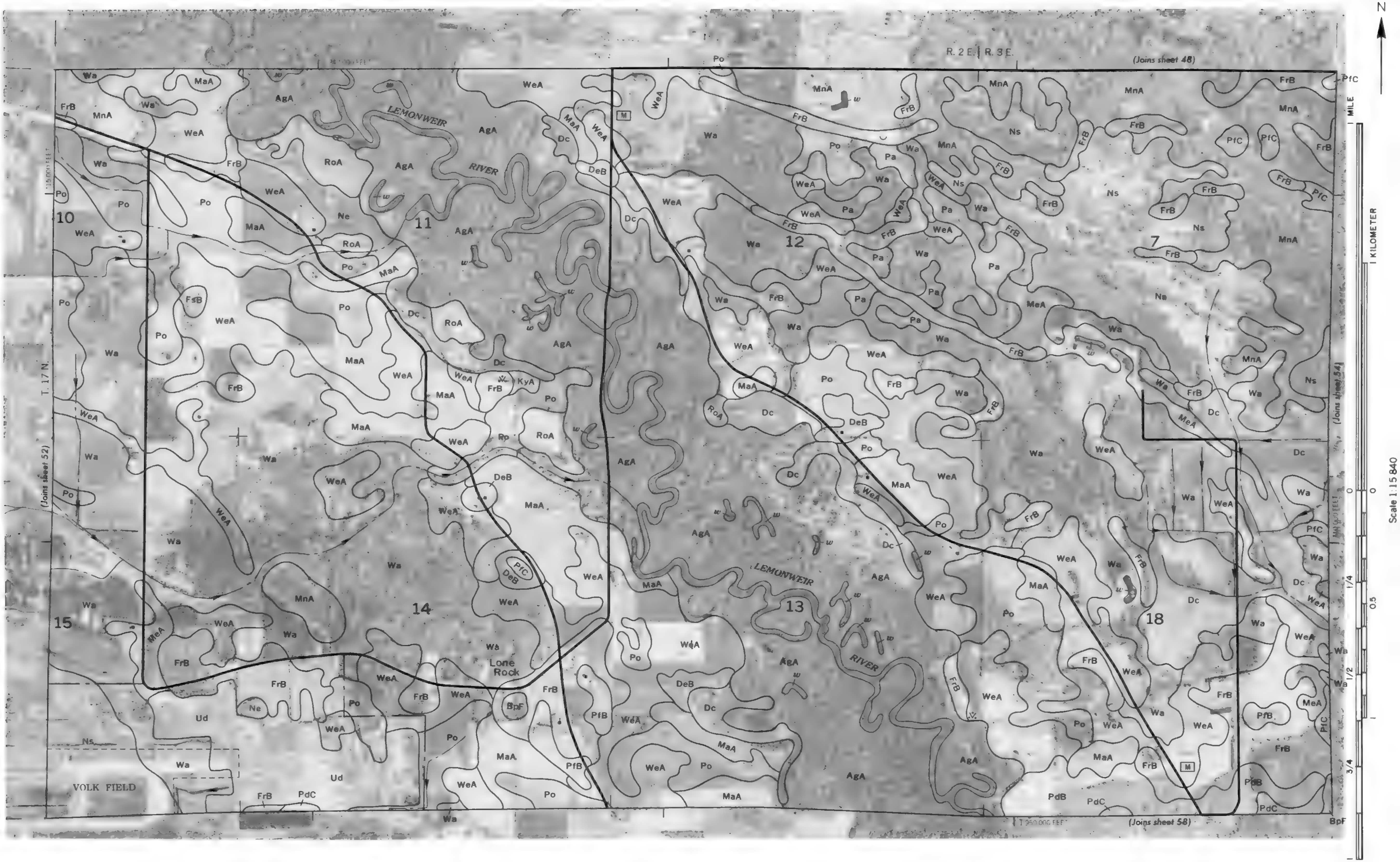

N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5
(Joins sheet 43)
(Joins sheet 47)
(Joins sheet 49)
(Joins sheet 53)
R. 2 E.
R. 3 E.
T. 18 N.
T. 17 N.
34
35
36
31
3
2
1
6
LEMONWEIR
RIVER

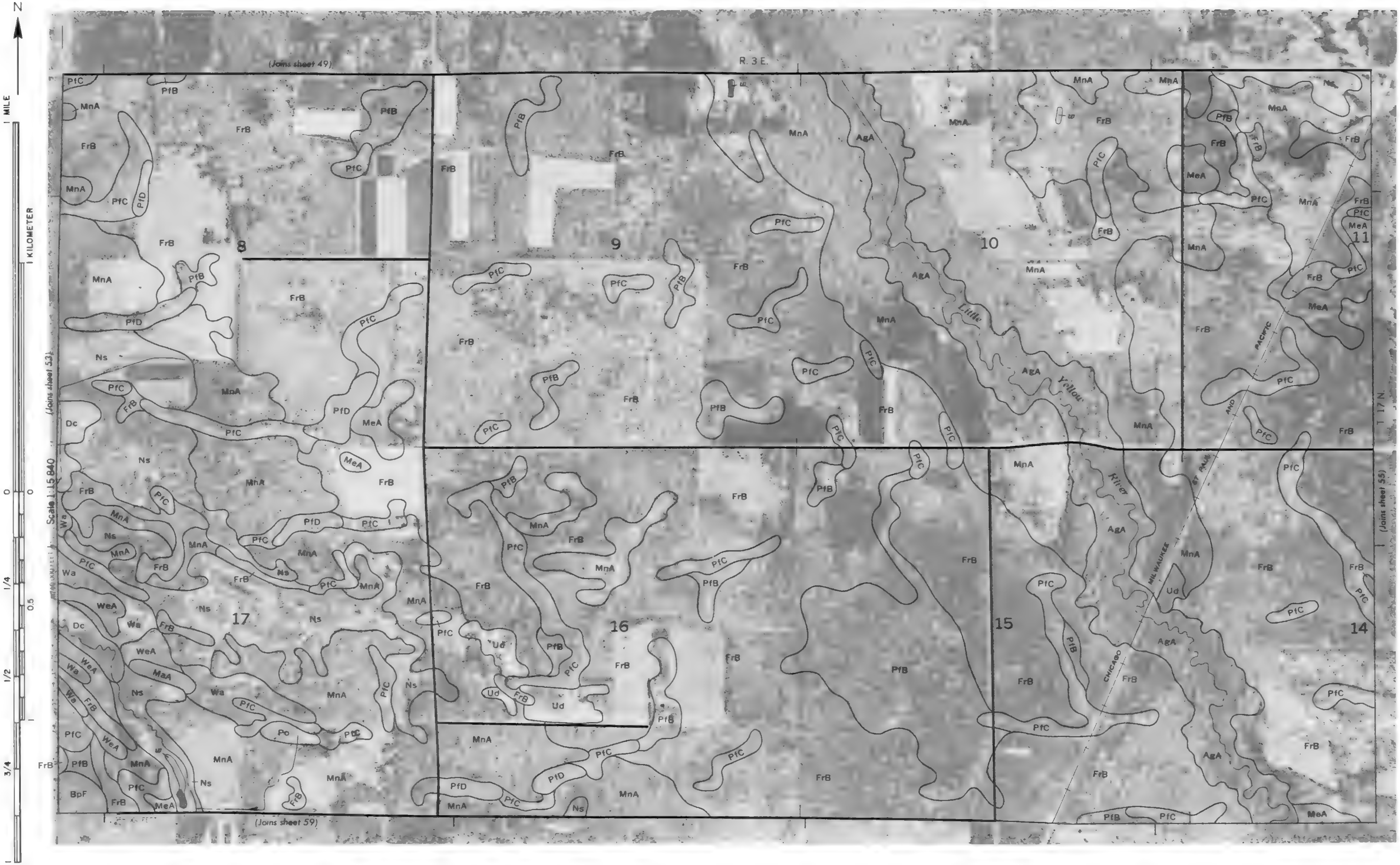

N
R. 3 E.
(Joins sheet 44)
(Joins sheet 48)
(Joins sheet 50)
(Joins sheet 54)
T. 18 N.
T. 17 N.
32
33
34
35
5
4
3
2
Little Yellow River
MnA
FrB
Ns
PfC
PfB
AgA
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5


N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0
0.5
(Joins sheet 45)
(Joins sheet 49)
(Joins sheet 51)
(Joins sheet 55)
R. 3 E.
R. 4 E.
T. 18 N.
T. 17 N.
35
36
31
32
2
1
6
5
CHICAGO
MILWAUKEE
ST PAUL
PACIFIC
DANISH CEMETERY
YELLOW RIVER
YELLOW RIVER
80
80
water
water
water
MnA
MeA
FrB
PfB
PfC
AgA
Ns

R. 4 E.
(Joins sheet 46)
(Joins sheet 50)
(Joins sheet 56)
T. 18 N.
T. 17 N.
1 995 000 FEET
725 000 FEET
ADAMS COUNTY
CHICAGO AND NORTHWESTERN
CASTLE ROCK LAKE
WISCONSIN RIVER
Whistling Wings Landing Strip
33
34
35
4
3
2
1
FrB
PfB
PfC
MnA
AgA
MeA
BpF
Ud
N
1 MILE
1 KILOMETER
Scale 1:15 840


N
1 MILE
1 KILOMETER
0
1/4
0.5
1/2
3/4
(Joins sheet 47)
R. 2 E.
Ragged Rock
MILL BLUFF STATE PARK
Long Bluff
CHICAGO AND NORTHWESTERN
MONROE COUNTY
T. 17 N.
(Joins sheet 53)
(Joins sheet 57)
VOLK FIELD
(Air National Guard)
water
7
8
9
10
15
16
17
18


N
R. 2 E. | R. 3 E.
(Joins sheet 48)
(Joins sheet 52)
(Joins sheet 54)
(Joins sheet 58)
T. 17 N.
LEMONWEIR RIVER
LEMONWEIR RIVER
Lone Rock
VOLK FIELD
10
11
12
7
15
14
13
18
MILE
KILOMETER
0
1/4
0.5
1/2
3/4
Scale 1:15 840
Wa
MaA
AgA
WeA
FrB
MnA
Po
RoA
Ne
Dc
DeB
Ns
Pa
PfC
FsB
KyA
Rp
PfB
BpF
Ud
PdC
PdB
MeA
w

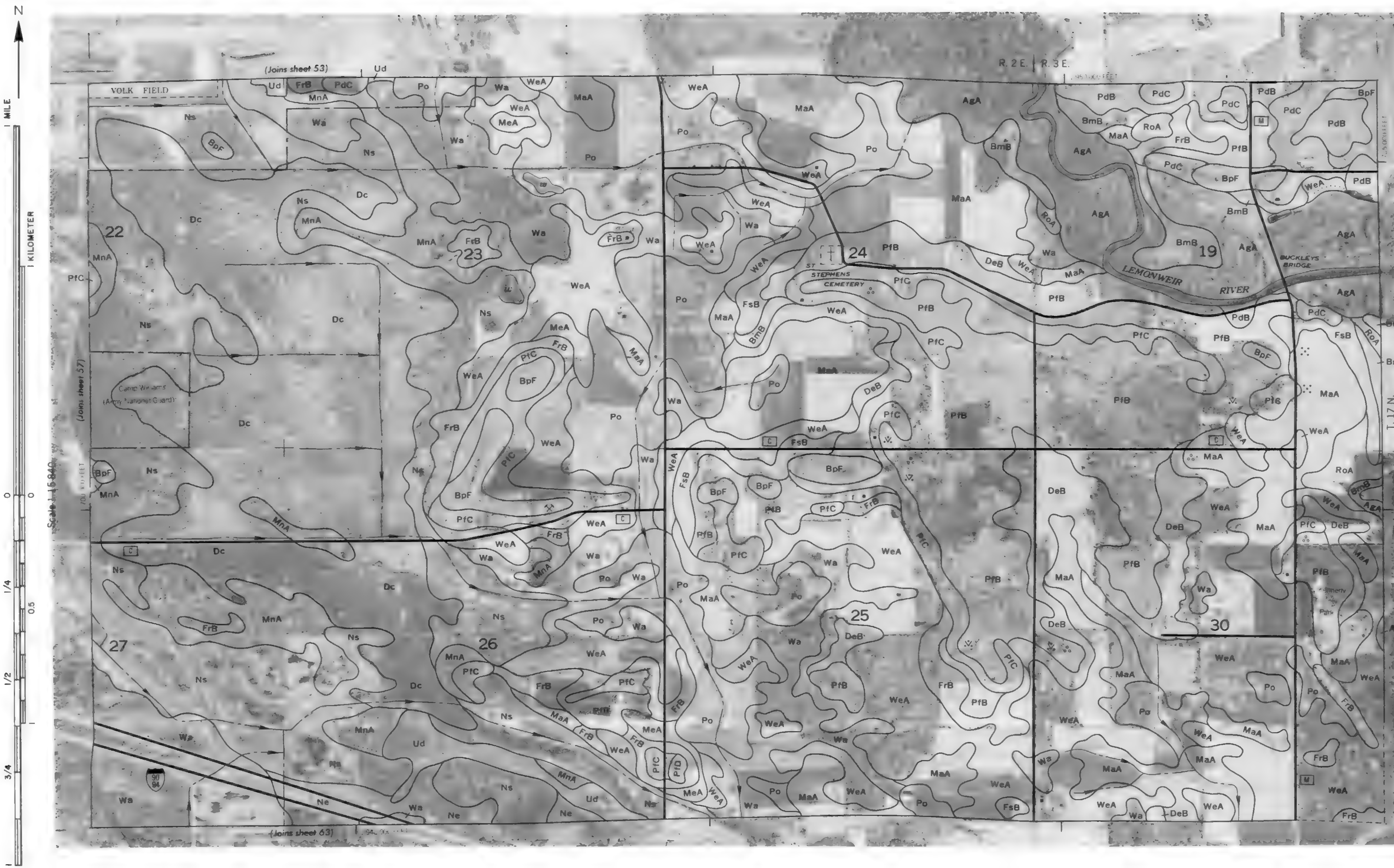


N
MILE
KILOMETER
Scale 1:15 840
(Joins sheet 49)
(Joins sheet 53)
(Joins sheet 55)
(Joins sheet 59)
R. 3 E.
T. 17 N.
8
9
10
11
14
15
16
17
Little Yellow River
CHICAGO MILWAUKEE ST PAUL AND PACIFIC
PfC
PfB
PfD
MnA
FrB
MeA
AgA
Ns
Dc
Wa
WeA
MaA
Po
Ud
BpF

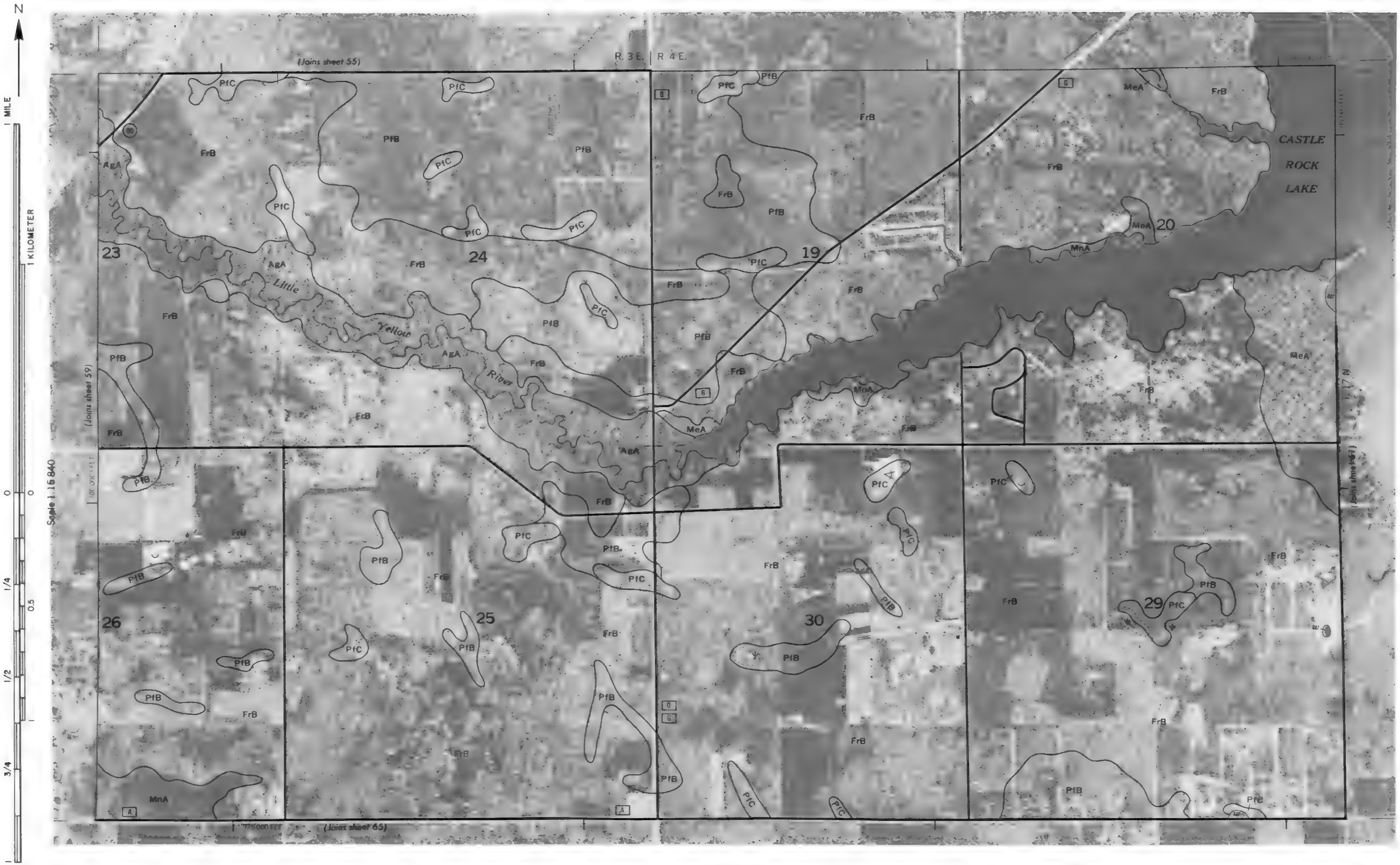

55
N
(Joins sheet 50)
(Joins sheet 54)
(Joins sheet 60)
(Joins sheet 30)
R. 3 E. R. 4 E.
T. 17 N.
YELLOW RIVER
CASTLE ROCK LAKE
BUCKHORN BRIDGE
11
12
7
8
14
13
18
17
FrB
PfB
PfC
MeA
MnA
AgA
MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840

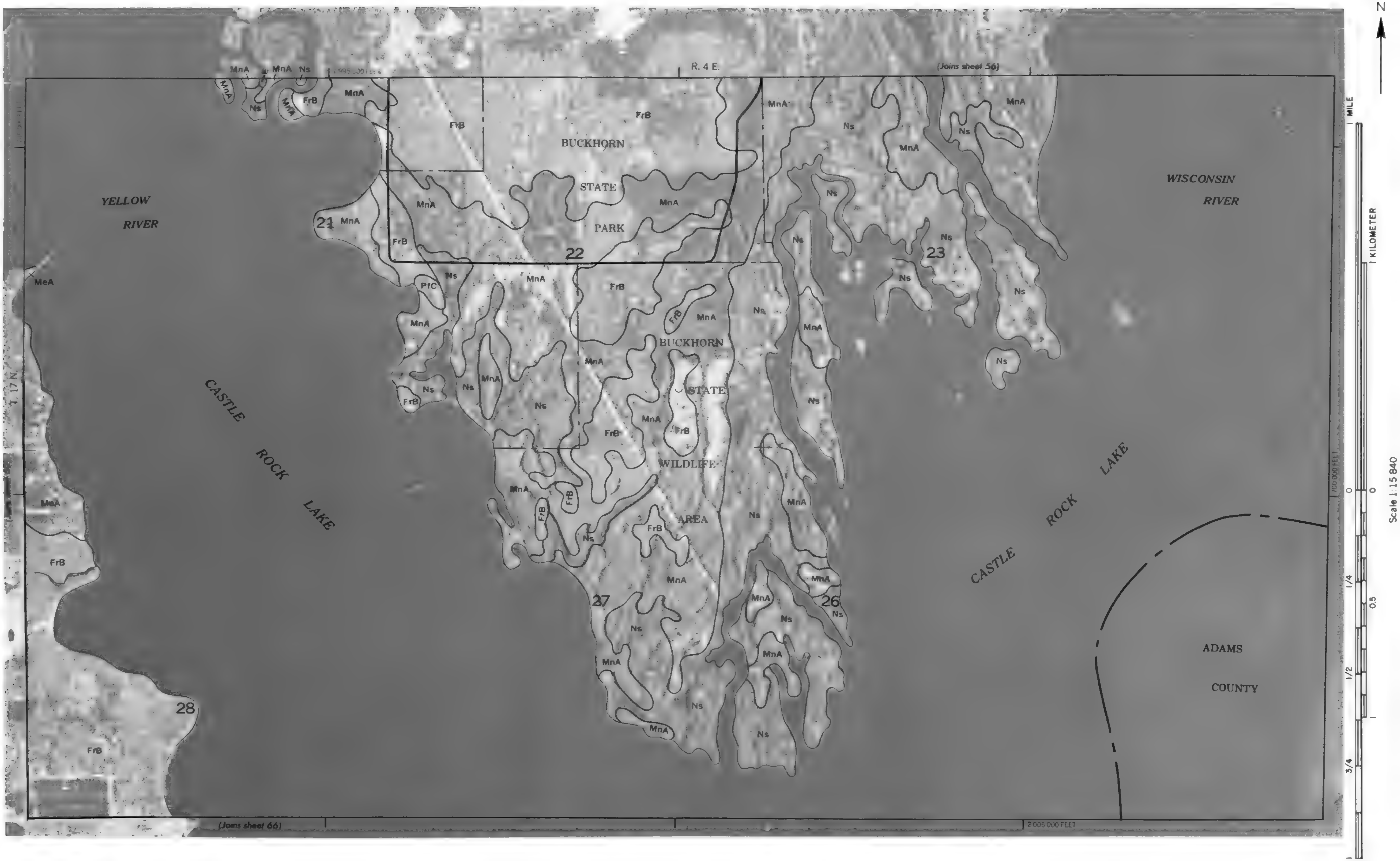

N
1 MILE
1 KILOMETER
0
1/4
0.5
1/2
3/4
(Joins sheet 51)
(Joins sheet 55)
(Joins sheet 61)
R. 4 E.
T. 17 N.
ADAMS COUNTY
CASTLE ROCK LAKE
YELLOW RIVER
WISCONSIN RIVER
BUCKHORN BRIDGE
BUCKHORN STATE PARK
BUCKHORN STATE WILDLIFE AREA
BOUNDARY
FrB
MeA
AgA
PfB
PfC
MnA
BmB
FsB
Ud
Ns


57
N
(Joins sheet 52)
R. 2 E.
1 920 000 FEET
VOLK FIELD
(Air National Guard)
Chinaman Bluff
Camp Williams
(Army National Guard)
ST JAMES CEM
CAMP DOUGLAS CEM
Camp Douglas
Castle Rock
Target Bluff
BOUNDARY
CHICAGO MILWAUKEE ST PAUL AND PACIFIC
CHICAGO AND NORTHWESTERN
water
19
20
21
22
27
28
29
30
T. 17 N.
MONROE COUNTY
(Joins sheet 58)
(Joins sheet 62)
MILE
KILOMETER
Scale 1:15 840


N
1 MILE
1 KILOMETER
Scale 1:15 840
(Joins sheet 53)
VOLK FIELD
R. 2 E. | R. 3 E.
(Joins sheet 57)
Camp Williams (Army National Guard)
(Joins sheet 63)
ST STEPHENS CEMETERY
LEMONWEIR RIVER
BUCKLEYS BRIDGE
T. 17 N.
19
22
23
24
25
26
27
30

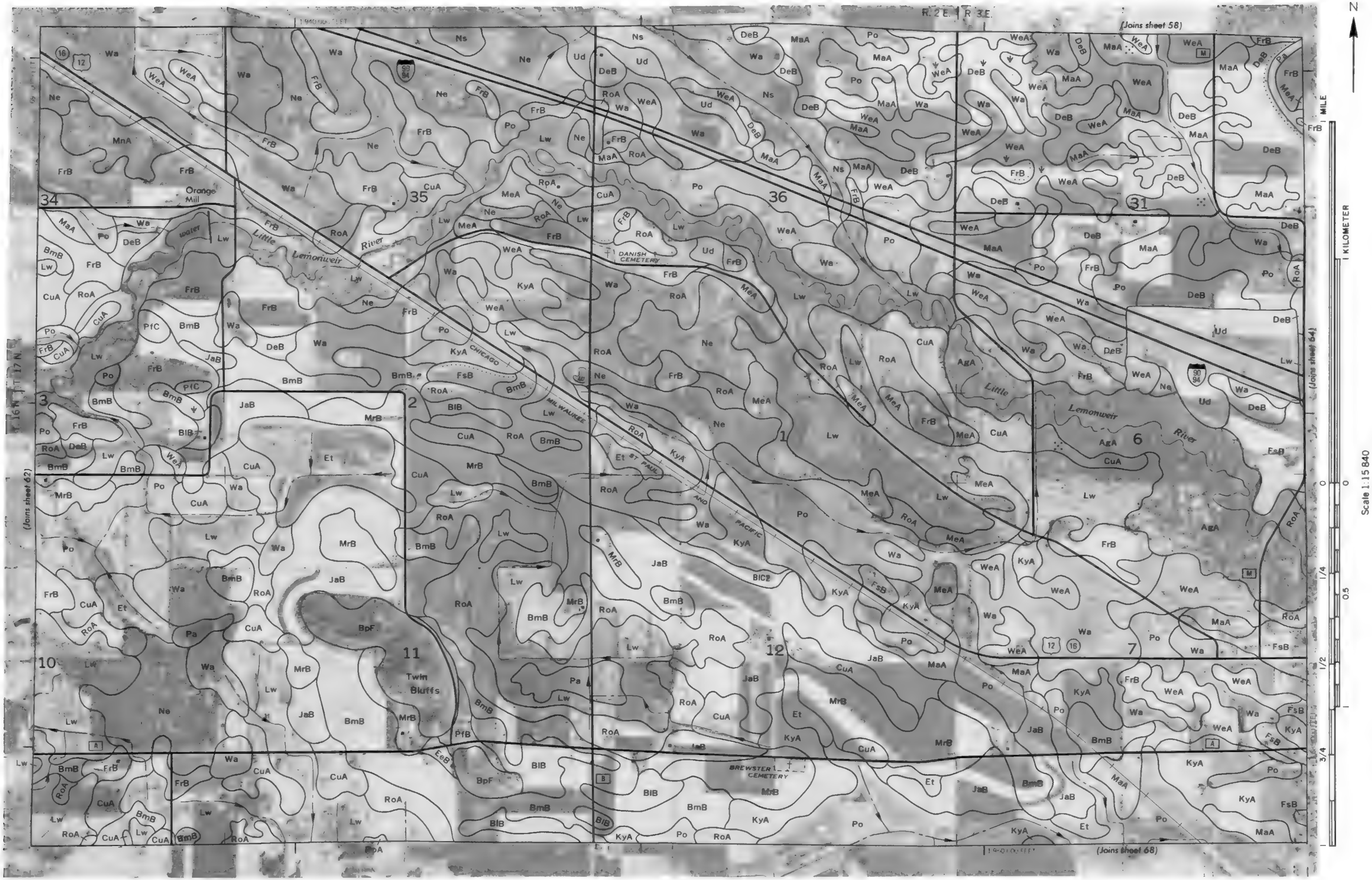
R. 3 E.
T. 17 N.
(Joins sheet 53)
(Joins sheet 58)
(Joins sheet 60)
(Joins sheet 64)
LEMONWEIR RIVER
Little Yellow River
JUNEAU COUNTY DITCH
CHICAGO MILWAUKEE ST. PAUL AND PACIFIC
Kennedy County Park
Landing Strip
20
21
22
23
26
27
28
29
N
MILE
1 KILOMETER
Scale 1:15 840


N
1 MILE
1 KILOMETER
0
1/4
0.5
1/2
3/4
Scale 1:15 840
(Joins sheet 55)
R. 3 E. | R. 4 E.
(Joins sheet 59)
(Joins sheet 61)
(Joins sheet 65)
T. 17 N.
CASTLE
ROCK
LAKE
Little
Yellow
River
23
24
19
20
26
25
30
29
FrB
PfB
PfC
AgA
MeA
MnA

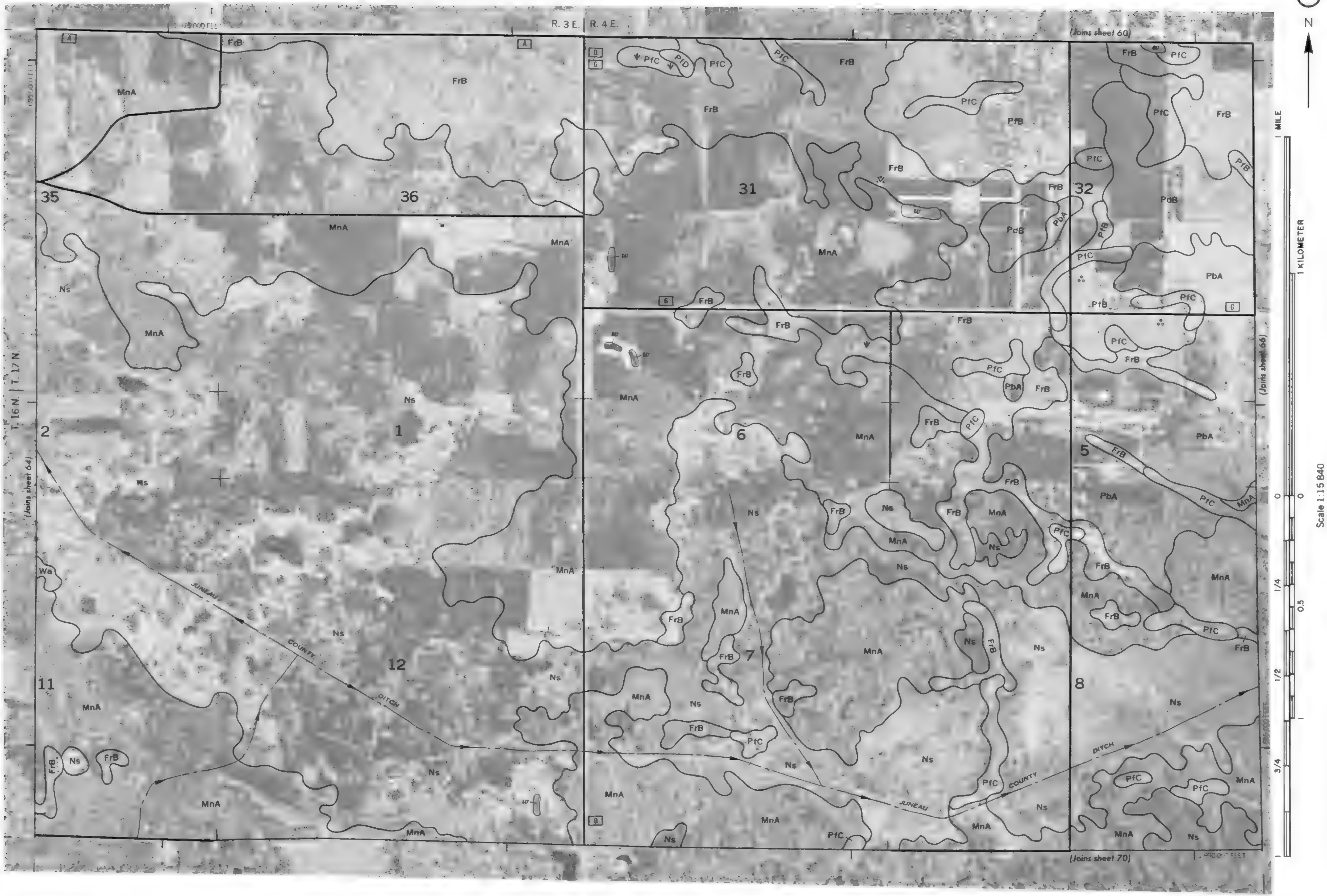


N
R. 4 E.
(Joins sheet 56)
(Joins sheet 66)
YELLOW
RIVER
WISCONSIN
RIVER
CASTLE ROCK LAKE
CASTLE ROCK LAKE
BUCKHORN
STATE
PARK
BUCKHORN
STATE
WILDLIFE
AREA
ADAMS
COUNTY
T. 17 N.
21
22
23
26
27
28
MnA
Ns
FrB
MeA
PfC
2 005 000 FEET
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840


N
1 MILE
1 KILOMETER
Scale 1:15 840
(Joins sheet 67)
R. 2 E.
MONROE COUNTY
(Joins sheet 63)
T. 16 N. | T. 17 N.
31
32
33
34
6
5
4
3
7
8
9
10
CHICAGO AND NORTHWESTERN
Little Lemonweir River
Little Lemonweir
Hustler
HUSTLER CEMETERY
185
(Joins sheet 67)

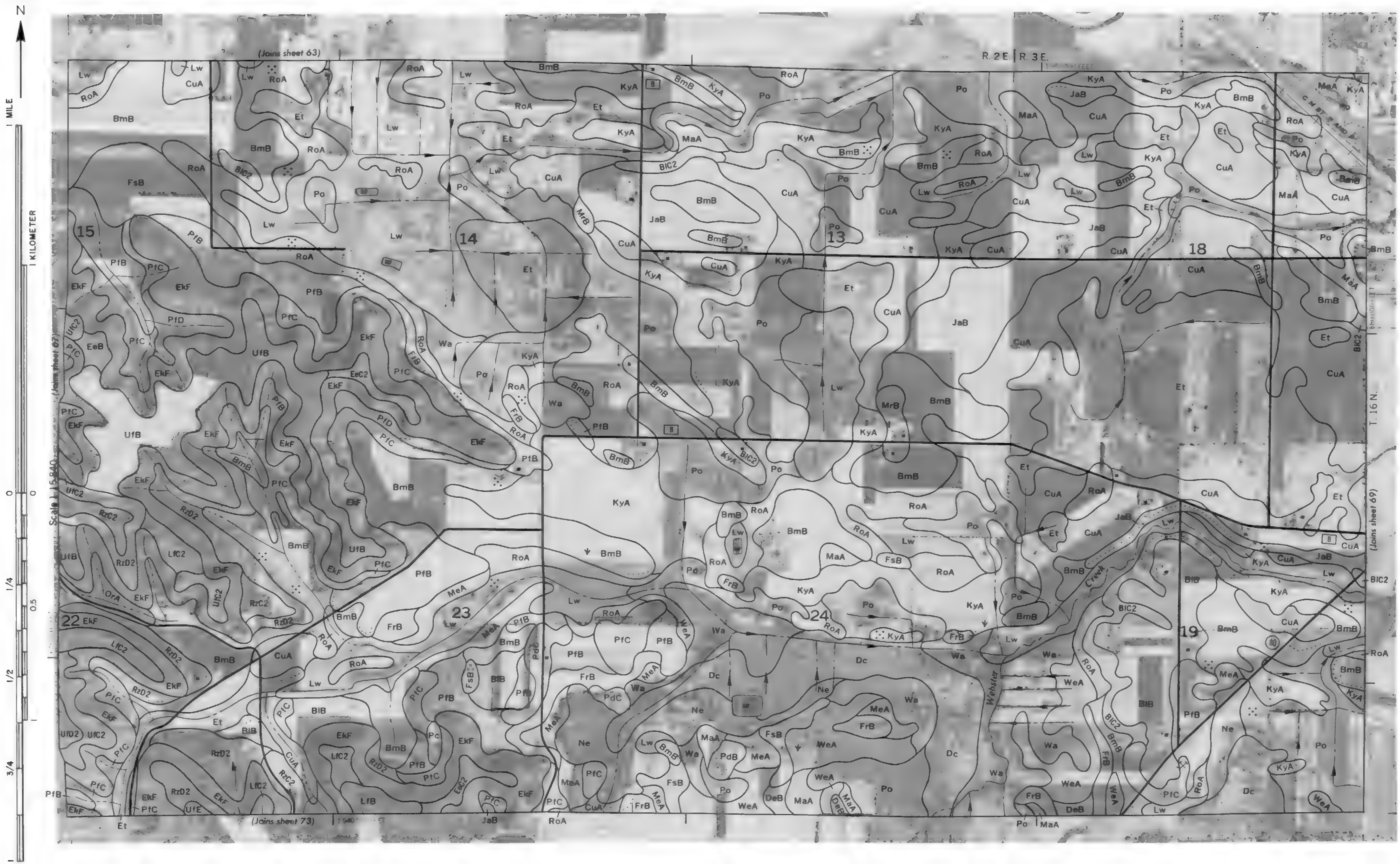

N
R. 2 E. | R. 3 E.
(Joins sheet 58)
(Joins sheet 64)
(Joins sheet 68)
(Joins sheet 62)
1 MILE
1 KILOMETER
Scale 1:15 840
Orange Mill
Little Lemonweir River
DANISH CEMETERY
CHICAGO MILWAUKEE ST PAUL AND PACIFIC
Twin Bluffs
BREWSTER CEMETERY
Little Lemonweir River
34
35
36
31
3
2
1
6
10
11
12
7


N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
(Joins sheet 59)
(Joins sheet 63)
(Joins sheet 65)
(Joins sheet 69)
R. 3 E.
T. 17 N.
T. 16 N.
32
33
34
35
5
4
3
2
8
9
10
11
LEMONWEIR RIVER
Little Lemonweir River
JUNEAU COUNTY DITCH
CHICAGO MILWAUKEE ST PAUL AND PACIFIC
ST PAULS CEM
NEW LISBON CEMETERY
New Lisbon
water
90
94
80
16
12
A

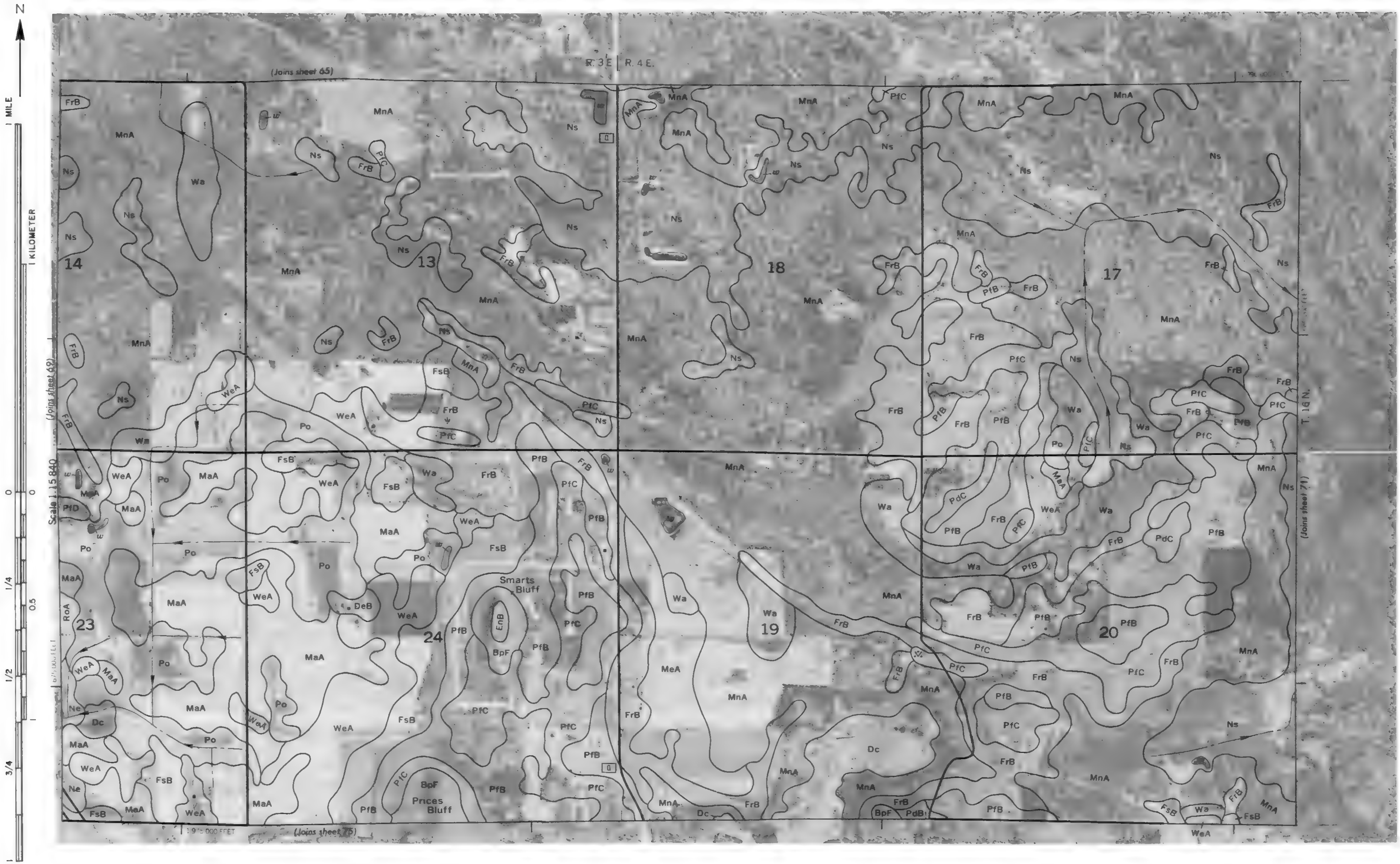

65
N
(Joins sheet 60)
(Joins sheet 64)
(Joins sheet 66)
(Joins sheet 70)
R. 3 E. | R. 4 E.
T. 16 N. | T. 17 N.
35
36
31
32
2
1
6
5
11
12
7
8
MnA
FrB
Ns
PfC
PfB
PbA
PdB
PbA
PfD
Wa
JUNEAU COUNTY DITCH
MILE
KILOMETER
Scale 1:15 840


N
1 MILE
1 KILOMETER
Scale 1:15 840
(Joins sheet 61)
R 4 E.
YELLOW RIVER
CASTLE ROCK LAKE
ADAMS COUNTY
WISCONSIN RIVER
(Joins sheet 65)
T. 16 N. | T. 17 N.
Our Lady of the Lake Church
GERMANTOWN CEMETERY
JUNEAU COUNTY DITCH
water
(Joins sheet 71)
33
34
35
4
3
2
9
10
11
12

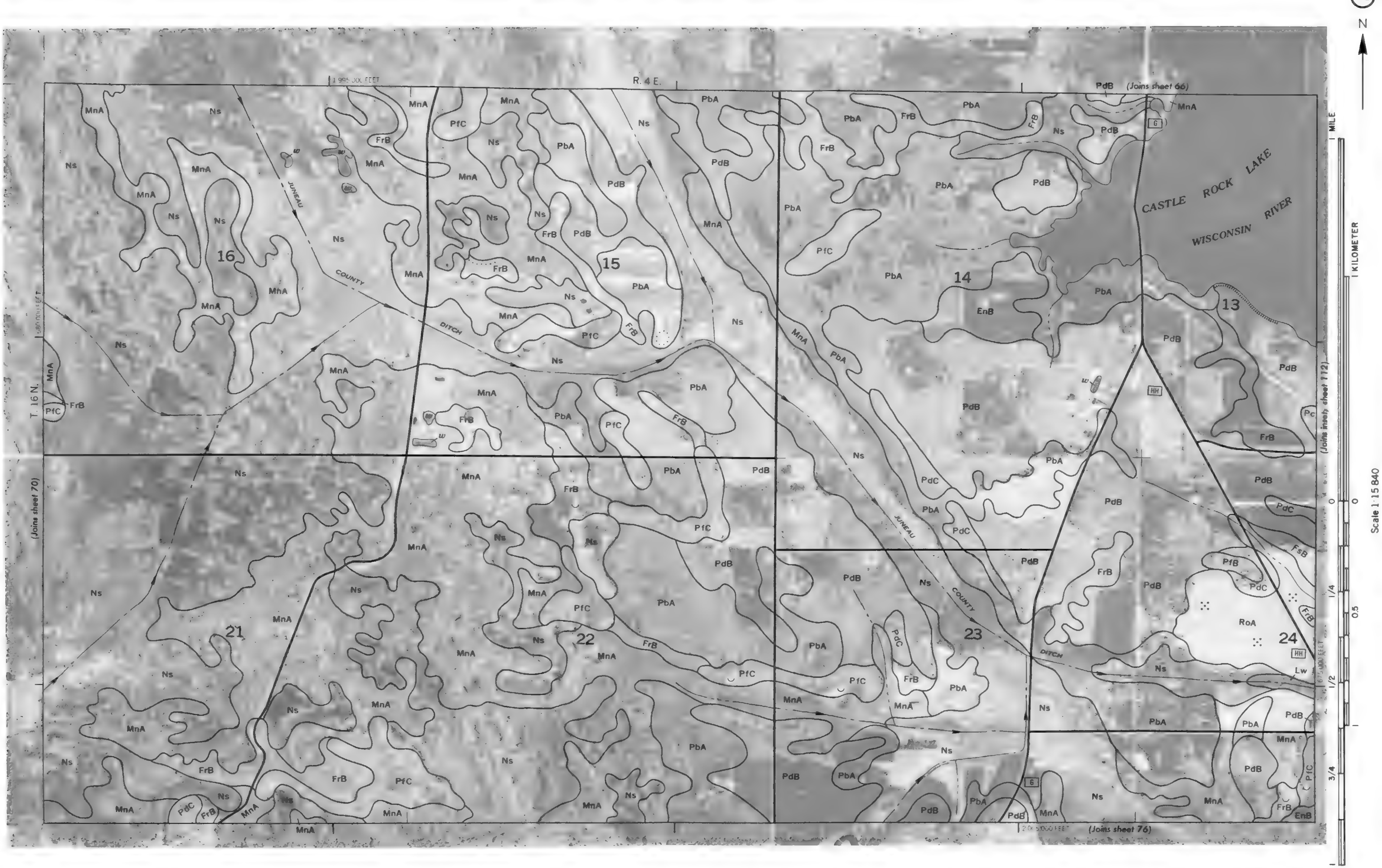

R. 2 E.
(Joins sheet 62)
(Joins sheet 68)
(Joins sheet 72)
T. 16 N.
MONROE COUNTY
CHICAGO AND NORTHWESTERN
Fountain Creek
Holon Creek
18
17
16
15
19
20
21
22
N
MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0.5


N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840
(Joins sheet 63)
(Joins sheet 67)
(Joins sheet 69)
(Joins sheet 73)
R. 2 E. | R. 3 E.
T. 16 N.
13
14
15
18
19
22
23
24
Webster Creek
BmB
CuA
KyA
RoA
Lw
Et
Po
JaB
MaA
PfB
PfC
EkF
UfB
RzD2
LfC2
BlB
BlC2
Wa
WeA
MeA
FrB
FsB
PdC
Dc
Ne
MrB
EeC2
UfC2
DeB
FsB


N
(Joins sheet 64)
R. 3 E.
T. 16 N.
(Joins sheet 68)
(Joins sheet 70)
(Joins sheet 74)
New Lisbon
LEMONWEIR RIVER
Webster Creek
CHICAGO MILWAUKEE ST. PAUL AND PACIFIC
Little Dells
14
15
16
17
20
21
22
23
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/8
1/4
0.5
3/4

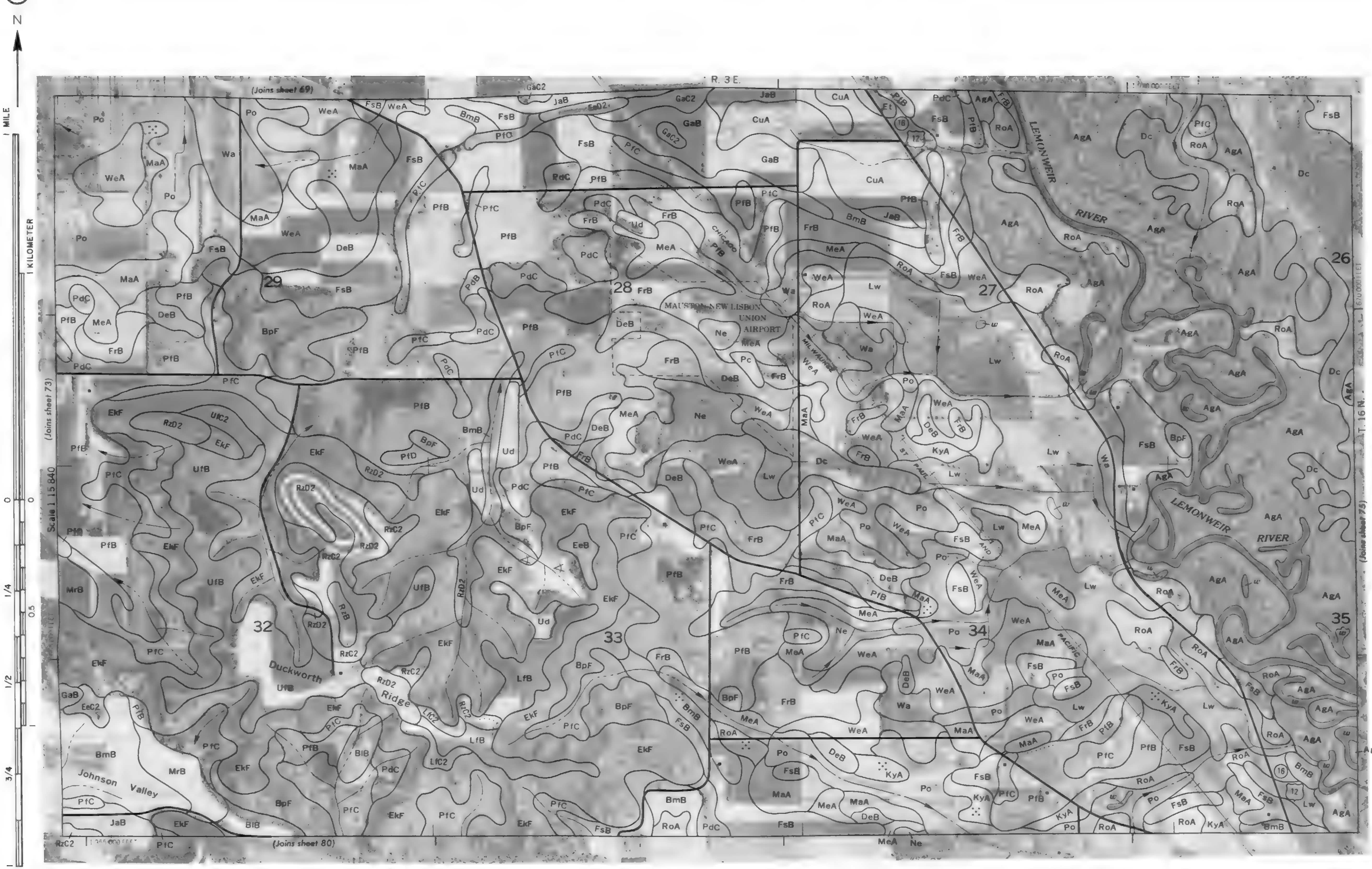


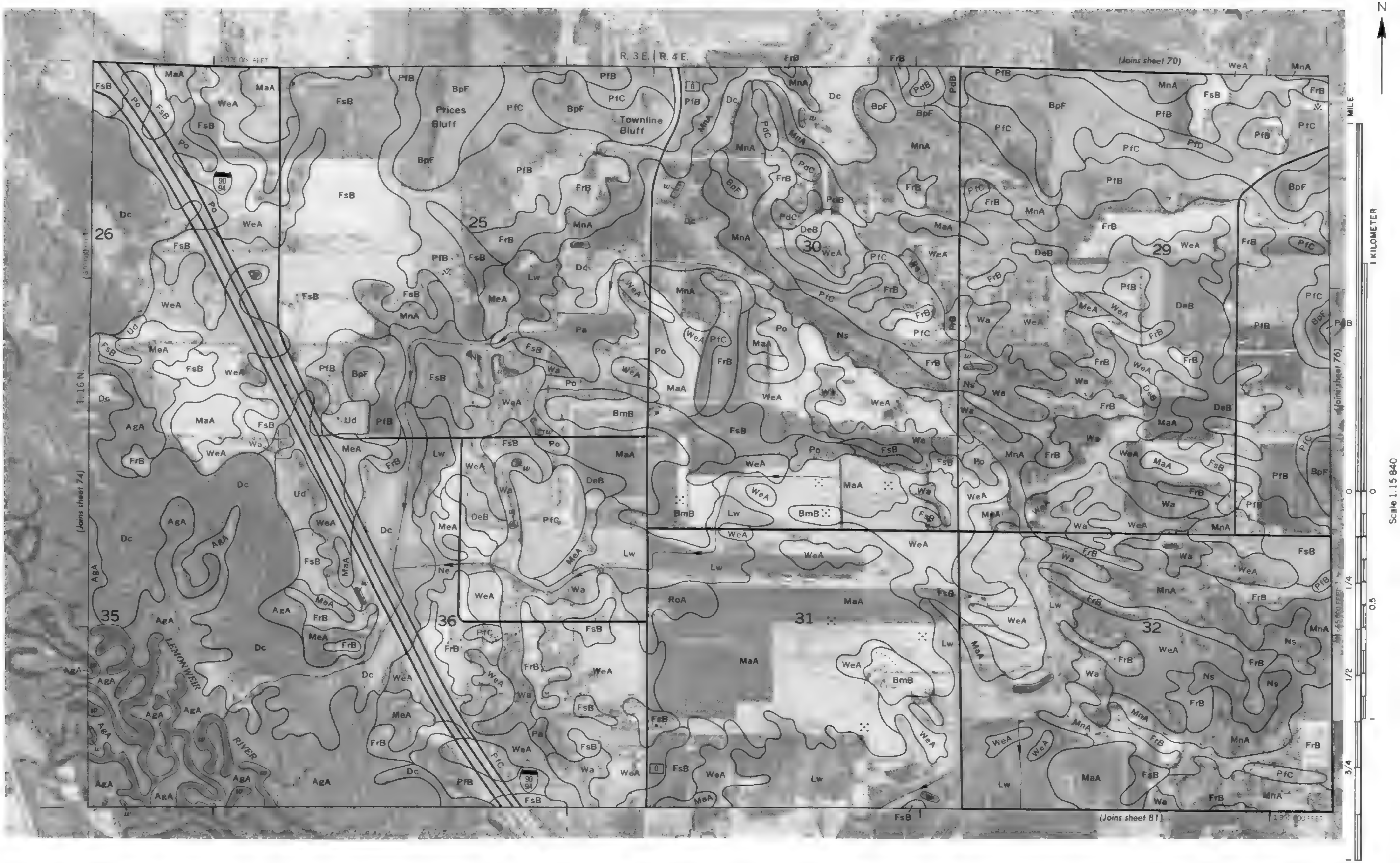
N
1 MILE
1 KILOMETER
0
0.5
1/4
1/2
3/4
Scale 1:15 840
(Joins sheet 65)
R. 3 E. | R. 4 E.
(Joins sheet 69)
(Joins sheet 71)
(Joins sheet 75)
T. 16 N.
14
13
18
17
23
24
19
20
Smarts Bluff
Prices Bluff
MnA
Ns
Wa
FrB
PfC
PfB
WeA
Po
MaA
FsB
MeA
Dc
DeB
EnB
BpF
PdC
PdB
Ne
RoA
PfD

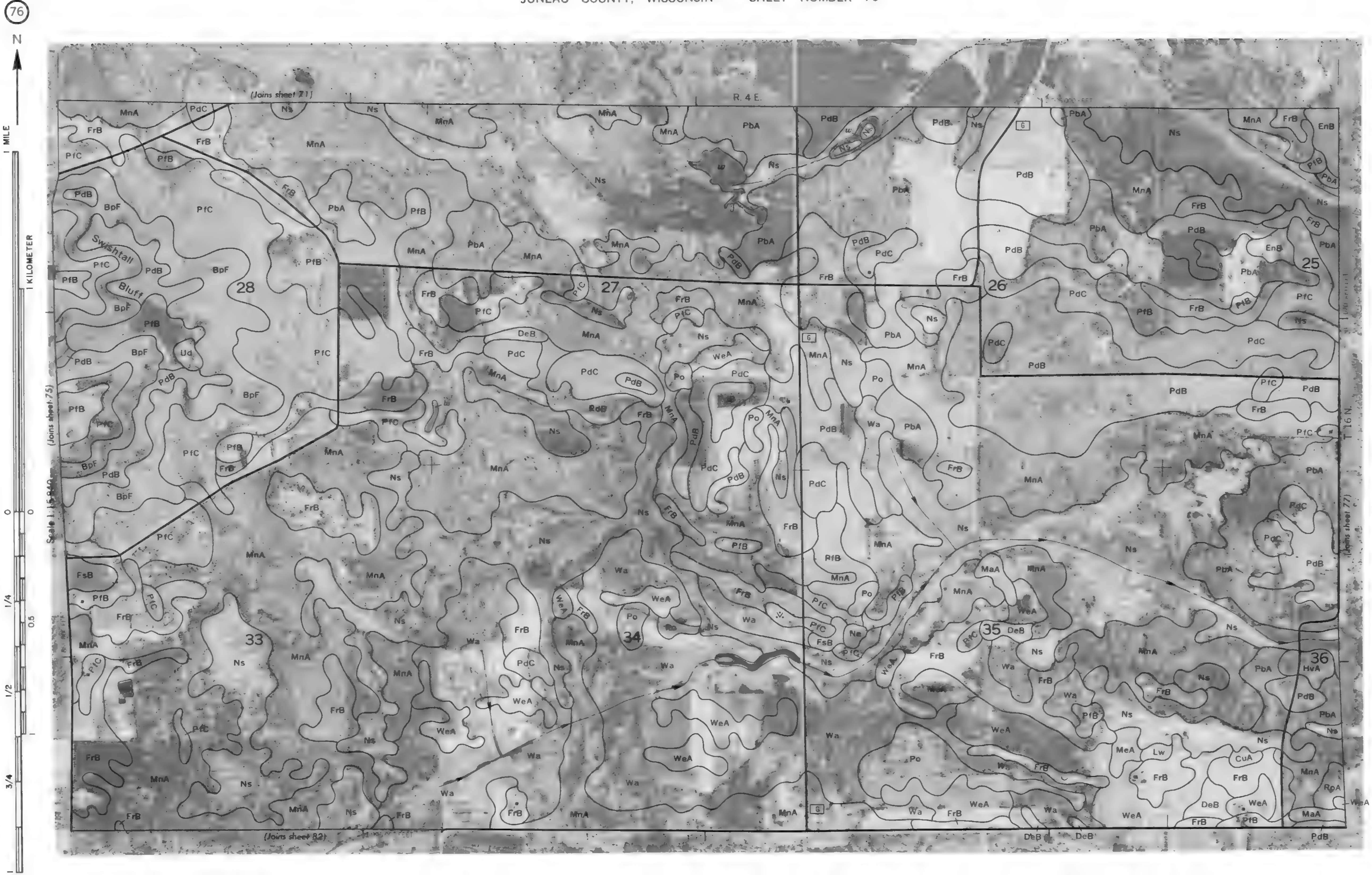

N
R. 4 E.
T. 16 N.
(Joins sheet 66)
(Joins sheet 70)
(Joins inset, sheet 112)
(Joins sheet 76)
CASTLE ROCK LAKE
WISCONSIN RIVER
JUNEAU COUNTY DITCH
16
15
14
13
21
22
23
24
MnA
Ns
PfC
FrB
PbA
PdB
PdC
EnB
MnA
RoA
FsB
PfB
Lw
Pc
w
6
HH
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840


N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
(Joins sheet 67)
R. 2 E.
MONROE COUNTY
T. 16 N.
(Joins sheet 73)
(Joins sheet 78)
30
29
28
27
31
32
33
34
Fountain Church
WEST LEMONWEIR CEM
TUNNEL
CHICAGO AND NORTHWESTERN
Teachout Valley


73
N
R. 2 E. | R. 3 E.
(Joins sheet 68)
(Joins sheet 72)
(Joins sheet 74)
(Joins sheet 79)
T. 16 N.
ZINDORF CEM
Teachout Valley
Church Valley
Webster Creek
East Lemonweir Church
Norwegian Gap
26
25
27
30
34
35
36
31
1 MILE
1 KILOMETER
Scale 1:15 840

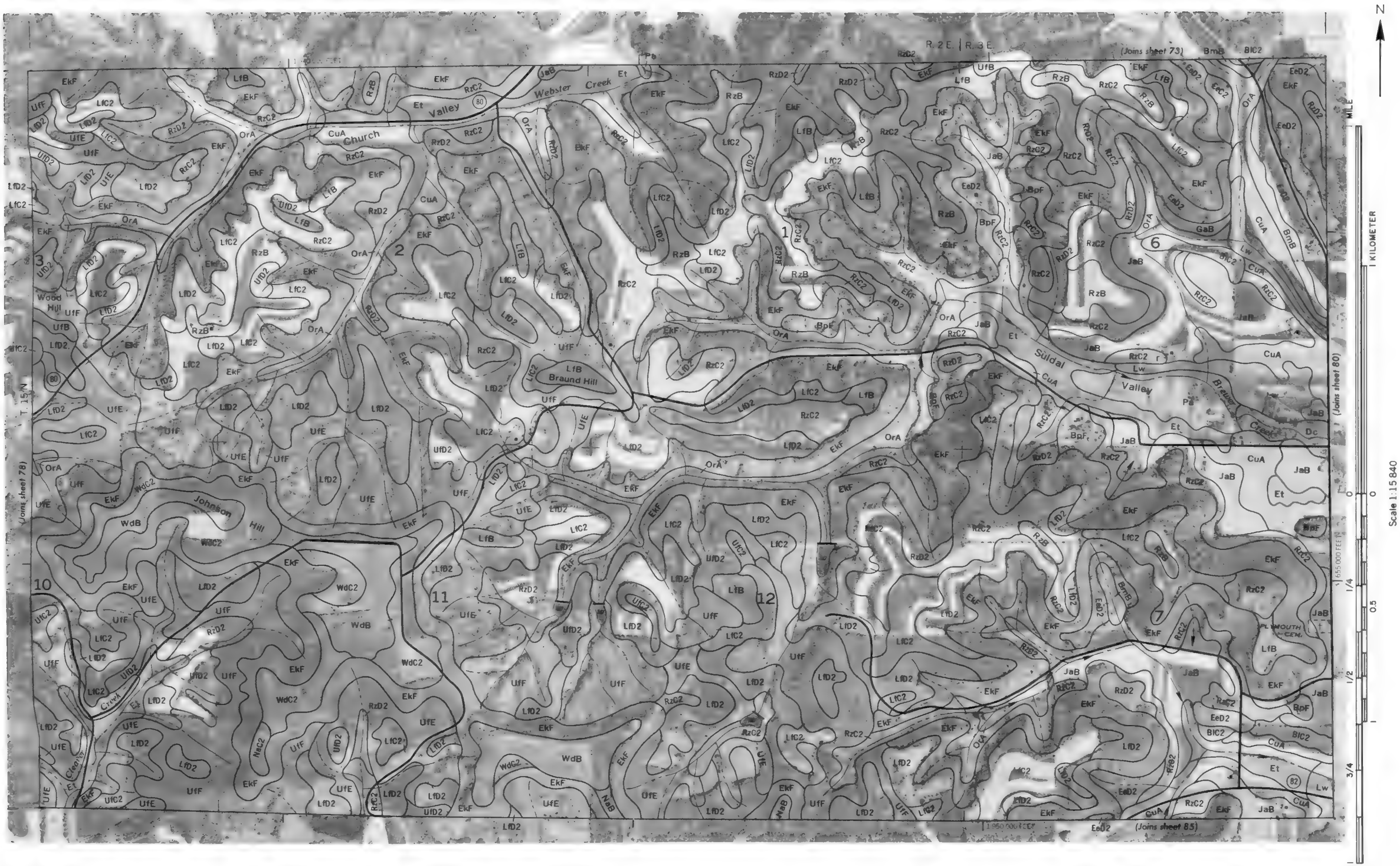

N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
R. 3 E.
(Joins sheet 69)
(Joins sheet 73)
(Joins sheet 75)
(Joins sheet 80)
T. 16 N.
LEMONWEIR
RIVER
LEMONWEIR
RIVER
MAUSTON-NEW LISBON
UNION
AIRPORT
CHICAGO
MILWAUKEE
ST. PAUL
AND
PACIFIC
Duckworth
Ridge
Johnson
Valley
26
27
28
29
32
33
34
35


R. 3 E. | R. 4 E.
(Joins sheet 70)
(Joins sheet 74)
(Joins sheet 76)
(Joins sheet 81)
T. 16 N.
Prices Bluff
Townline Bluff
LEMONWEIR RIVER
26
25
30
29
35
36
31
32
N
MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0.5


76
N
1 MILE
1 KILOMETER
Scale 1:15 840
(Joins sheet 71)
R. 4 E.
T. 16 N.
(Joins sheet 75)
(Joins sheet 77)
(Joins sheet 82)
Swishtail Bluff
25
26
27
28
33
34
35
36
MnA
PdC
Ns
FrB
PfC
PfB
PdB
PbA
BpF
Ud
FsB
Po
Wa
WeA
DeB
MaA
MeA
Lw
CuA
HvA
EnB
RoA
Ne

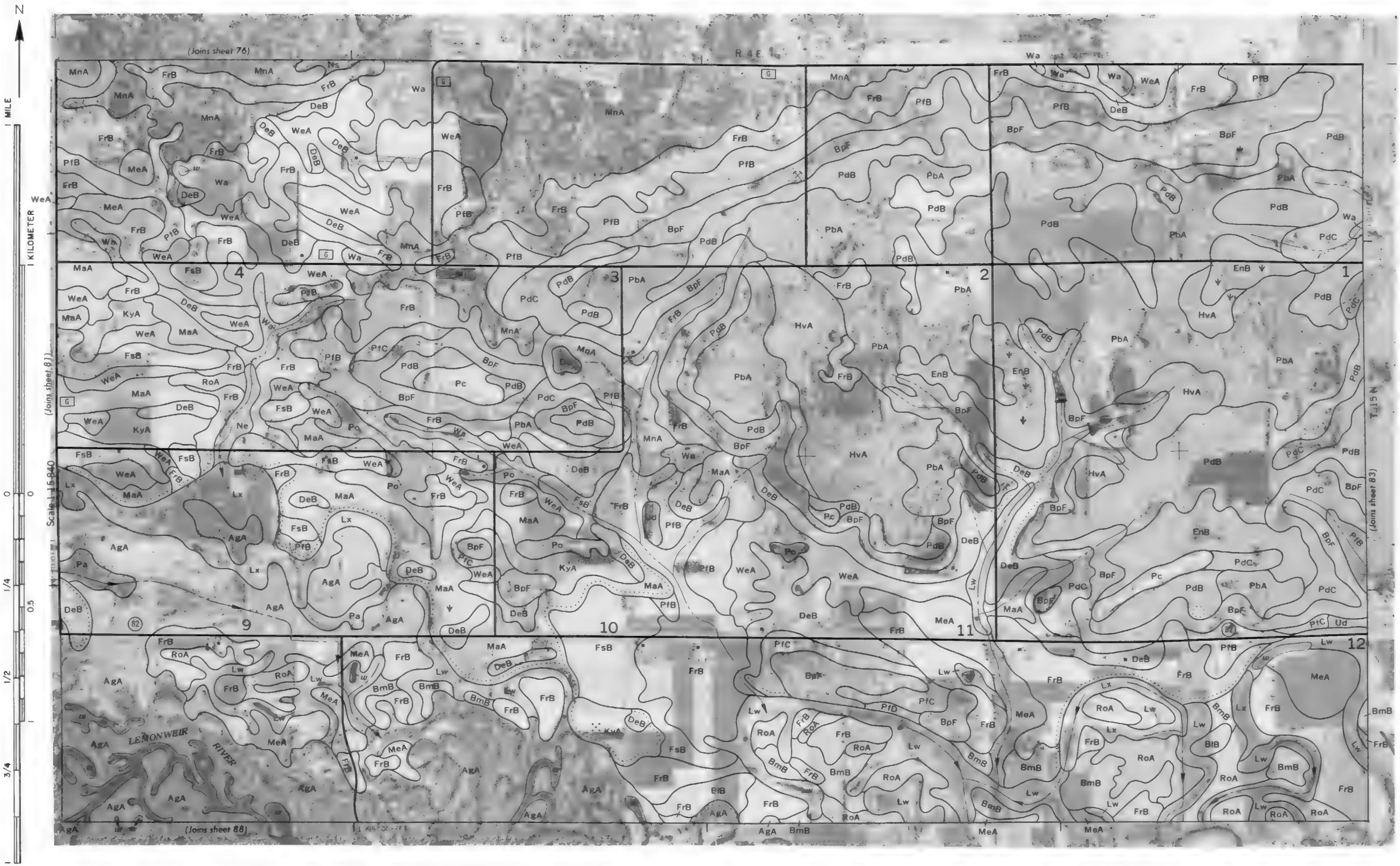

77
N
(Joins inset, sheet 112)
R. 4 E.
R. 5 E.
T. 16 N.
(Joins sheet 76)
(Joins sheet 83)
ADAMS COUNTY
WISCONSIN RIVER
ST. MICHAELS CEM
Water
25
29
30
31
32
36
EnB
PbA
RoA
PdB
FrB
AgA
PfB
PfC
Ns
MnA
PdC
HvA
MaA
WeA
FsB
BpF
HH
MILE
1 KILOMETER
0
1/4
1/2
3/4
1
0.5
Scale 1:15 840


N
1 MILE
1 KILOMETER
Scale 1:15 840
(Joins sheet 72)
(Joins sheet 79)
(Joins sheet 84)
R. 2 E.
T. 16 N.
MONROE COUNTY
Wood Hill
Sherman Valley


N
R. 2 E. | R. 3 E.
(Joins sheet 73)
(Joins sheet 78)
(Joins sheet 80)
(Joins sheet 85)
T. 15 N.
Webster Creek
Church Valley
Braund Hill
Wood Hill
Johnson Hill
Süldal Valley
Brauer Creek
Clear Creek
PLYMOUTH CEM.
80
82
1
2
3
6
7
10
11
12
MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0.5
1 655 000 FEET
1 950 000 FEET


N
1 MILE
1 KILOMETER
Scale 1:15 840
(Joins sheet 74)
(Joins sheet 79)
(Joins sheet 81)
(Joins sheet 86)
R. 3 E.
T. 15 N.
RYDER RIDGE
Windy Gap
Johnson Valley
Twin Bluffs
Brewer Creek
SULDAL CEMETERY


N
(Joins sheet 75)
(Joins sheet 80)
(Joins sheet 82)
(Joins sheet 87)
R. 3 E.
R. 4 E.
T. 15 N.
DECORAH
LAKE
MAUSTON
LEMONWEIR
RIVER
CHICAGO
MILWAUKEE
ST. PAUL
AND
PACIFIC
1
2
5
6
7
8
11
12
MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5


82
N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0
0.5
Scale 1:15 840
(Joins sheet 76)
(Joins sheet 81)
(Joins sheet 83)
(Joins sheet 88)
R. 4 E.
T. 15 N.
LEMONWEIR
RIVER
1
2
3
4
9
10
11
12

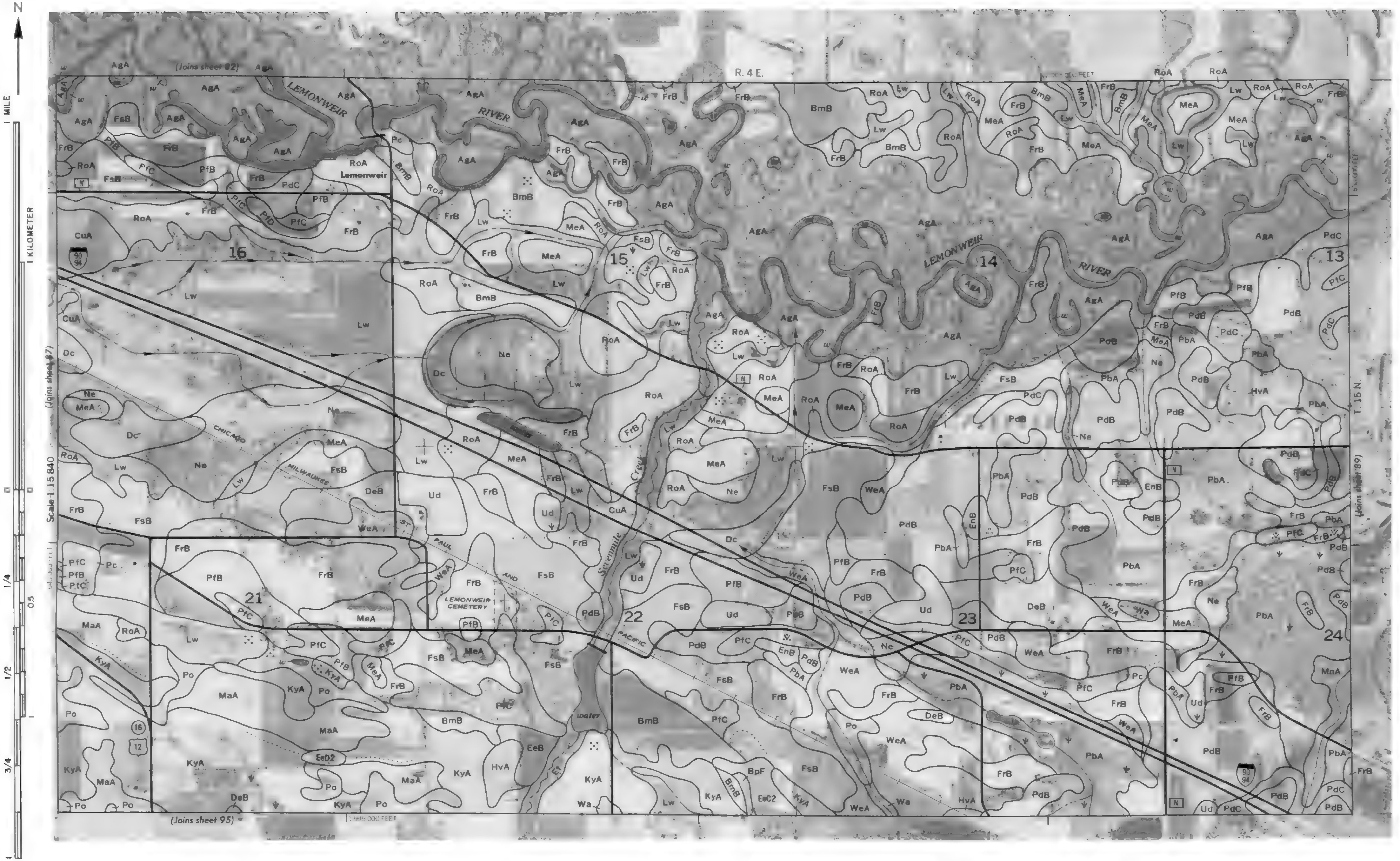

83
N
(Joins sheet 77)
R. 4 E. | R. 5 E.
AREA OF REDUCED RELIABILITY
WISCONSIN RIVER
ADAMS COUNTY
Castle Rock
T. 15 N.
(Joins sheet 82)
(Joins sheet 89)
MASON CEMETERY
MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
1

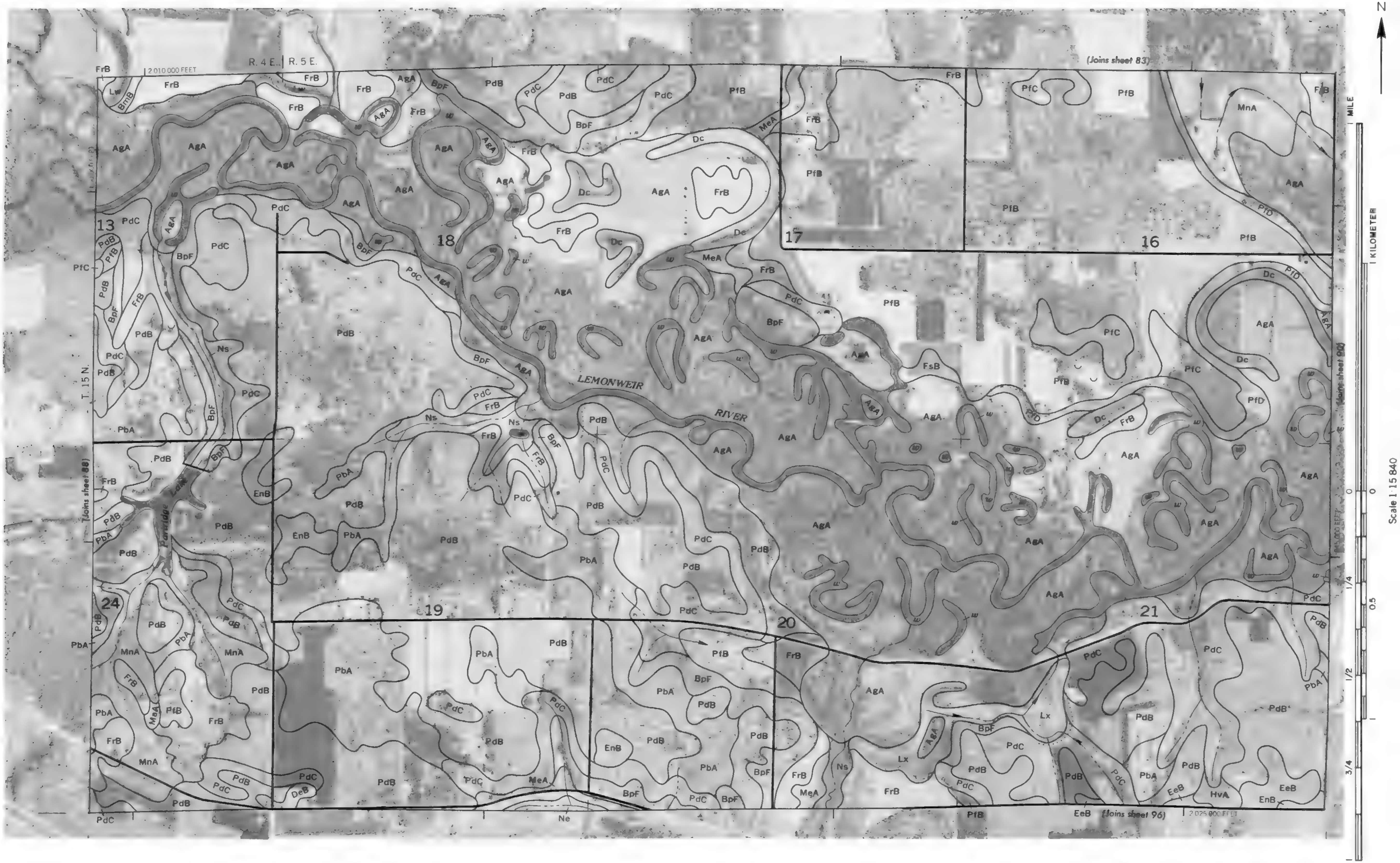

N
MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0.5
(Joins sheet 78)
(Joins sheet 85)
(Joins sheet 91)
R. 2 E.
T. 15 N.
MONROE COUNTY
Sherman Valley
CHICAGO AND NORTHWESTERN
Baraboo River
ELROY-SPARTA STATE TRAIL
Cleaver Creek
15
16
17
18
19
20
21
22


85
N
(Joins sheet 79)
(Joins sheet 92)
(Joins sheet 84)
(Joins sheet 86)
R. 2 E. | R. 3 E.
T. 15 N.
1 940 000 FEET
1 955 000 FEET
645 000 FEET
MT. ZION CEM
Cleaver Creek
13
14
15
18
19
22
23
24
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5

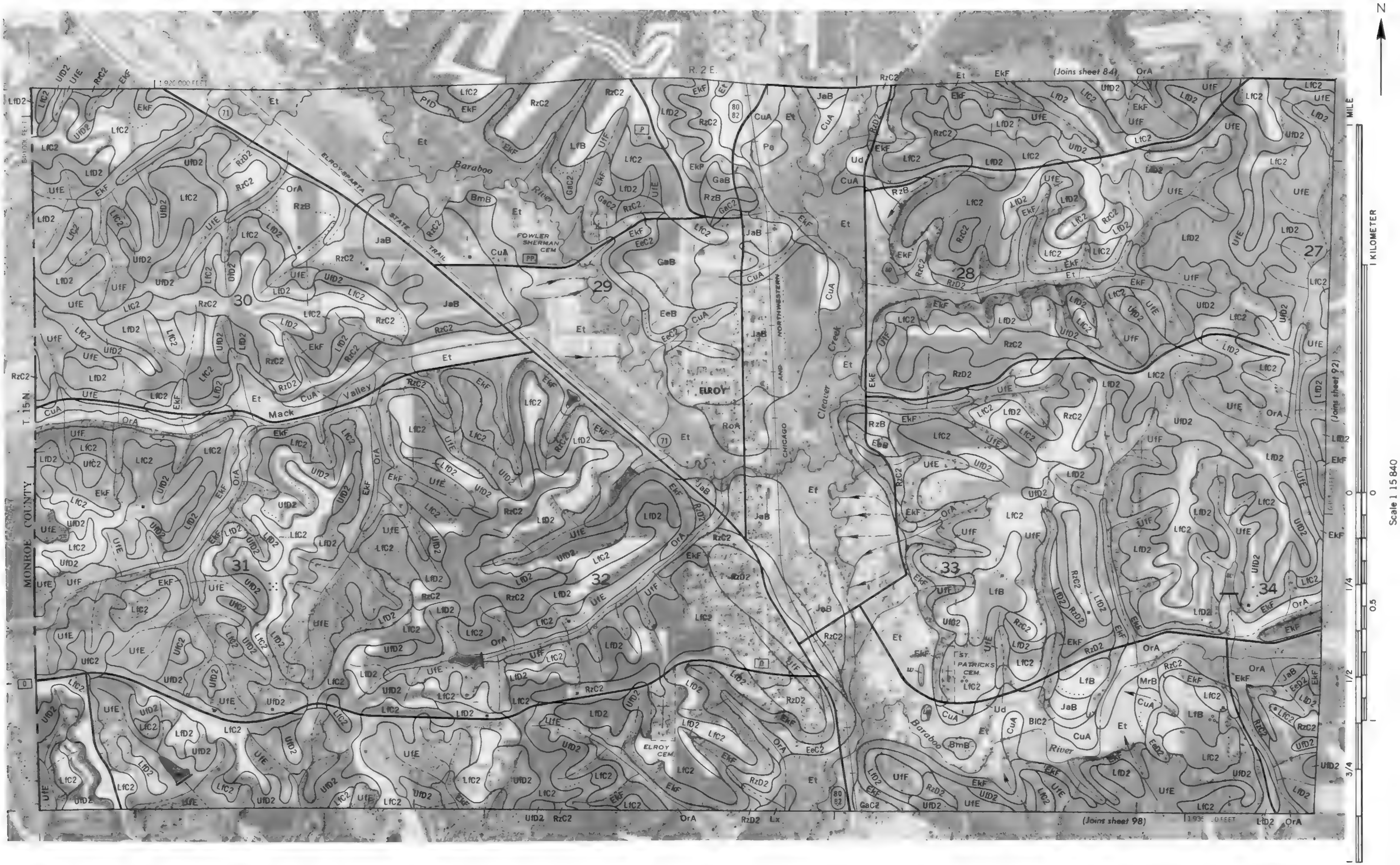

N
(Joins sheet 80)
(Joins sheet 93)
(Joins sheet 85)
(Joins sheet 87)
R. 3 E.
T. 15 N.
Coon Rock
ROCK VALLEY CEM.
14
15
16
17
20
21
22
23
1 955 000 FEET
Scale 1:15 840
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5

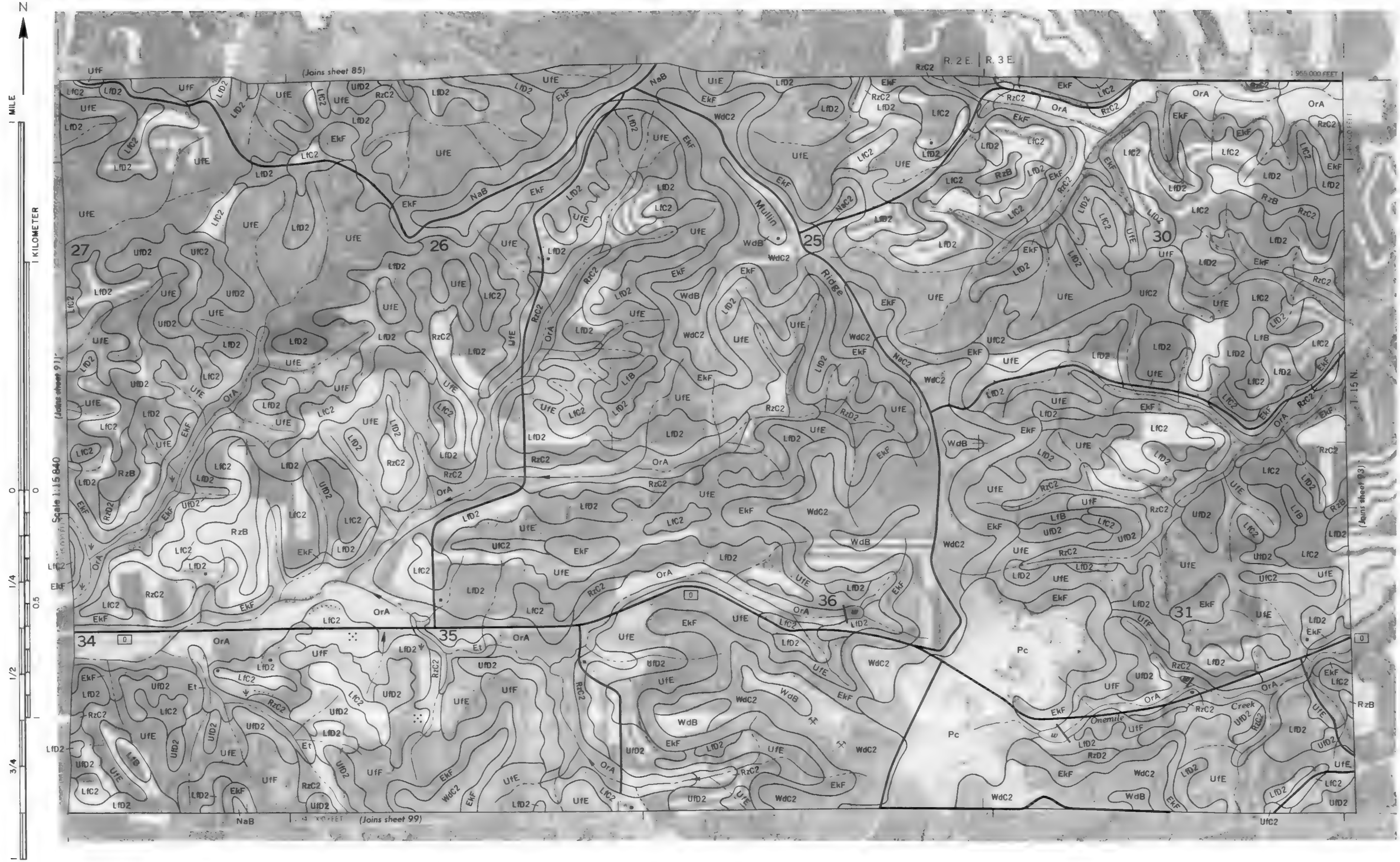

(Joins sheet 81)
(Joins sheet 88)
(Joins sheet 94)
(Joins sheet 86)
R. 3 E. | R. 4 E.
T. 15 N.
N
1 MILE
1 KILOMETER
Scale 1:15 840
Onemile Creek
Onemile Bluff
Cattail Valley
Cattail Creek
LEMONWEIR RIVER
CHICAGO MILWAUKEE ST. PAUL AND PACIFIC
ST PATRICKS CEM
AREA OF REDUCED RELIABILITY
water
13
14
17
18
19
20
23
24

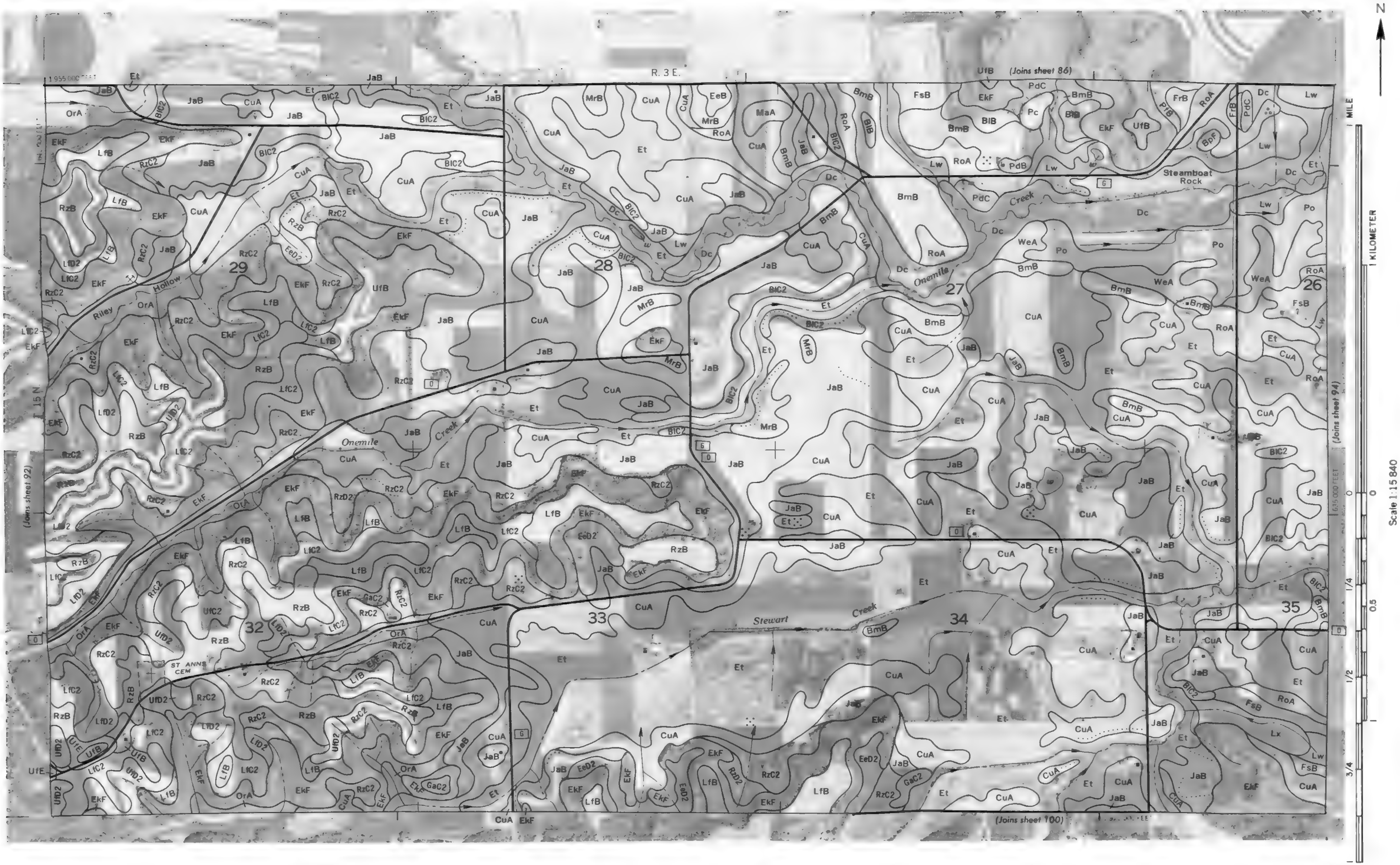

N
1 MILE
1 KILOMETER
Scale 1:15 840
(Joins sheet 82)
(Joins sheet 87)
(Joins sheet 89)
(Joins sheet 95)
R. 4 E.
T. 15 N.
LEMONWEIR RIVER
Lemonweir
LEMONWEIR CEMETERY
CHICAGO MILWAUKEE ST PAUL AND PACIFIC
Sevenmile Creek
Water
16
15
14
13
21
22
23
24

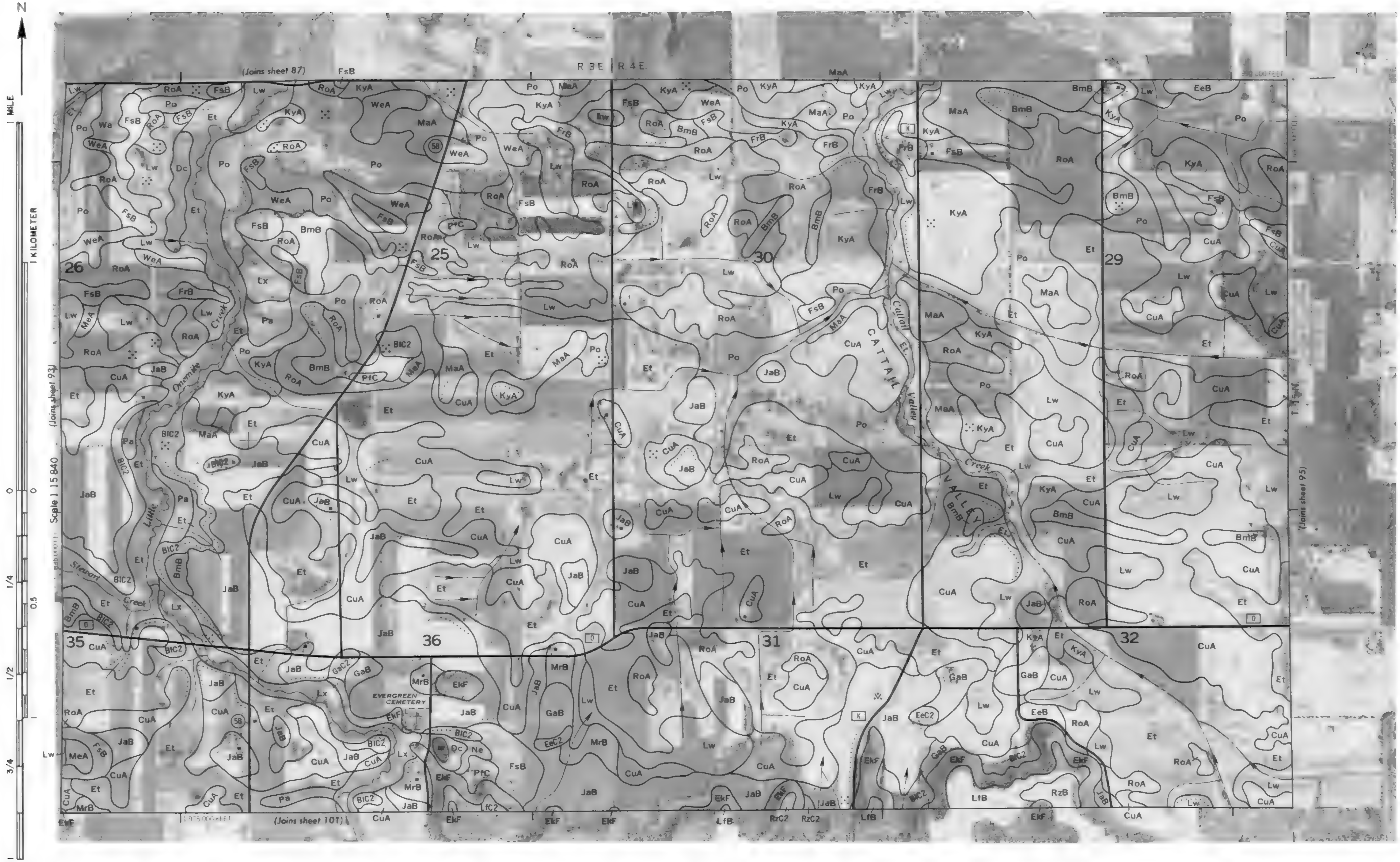

N
(Joins sheet 83)
(Joins sheet 88)
(Joins sheet 90)
(Joins sheet 96)
R. 4 E.
R. 5 E.
T. 15 N.
2 010 000 FEET
2 025 000 FEET
LEMONWEIR
RIVER
Partridge Lake
13
18
17
16
24
19
20
21
MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
AgA
PdB
PdC
FrB
PfB
PfC
PfD
BpF
Dc
MeA
FsB
Ns
PbA
EnB
MnA
Lx
EeB
HvA
DeB
Ne
BmB
Lw
w

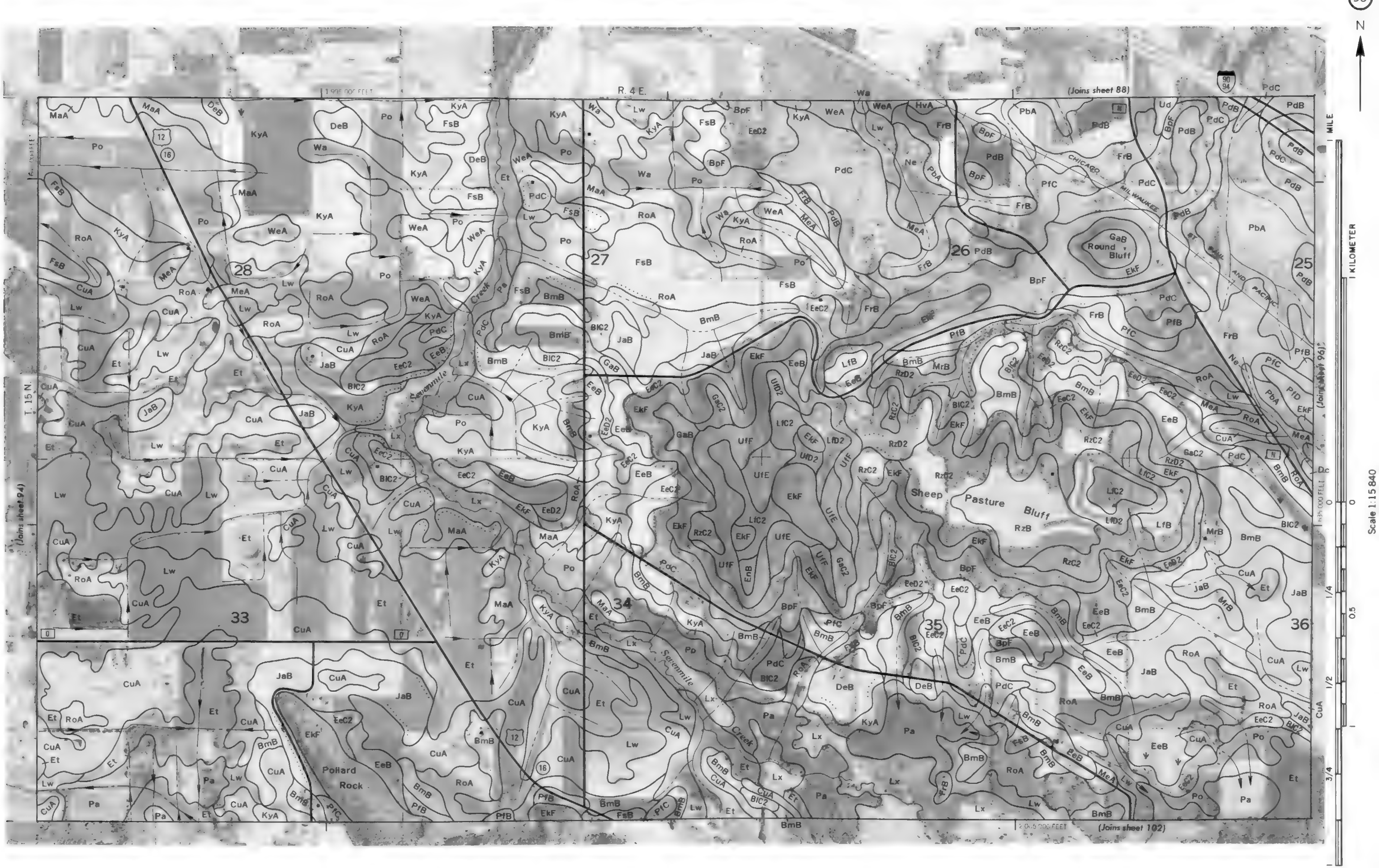

N
1 MILE
1 KILOMETER
0
1/4
0.5
1/2
3/4
(Joins inset, sheet 120)
R. 5 E.
(Joins sheet 97)
T. 15 N.
WISCONSIN RIVER
LEMONWEIR RIVER
ADAMS COUNTY
14
15
22
23
82
HH
Ud
FrB
BmB
MaA
AgA
PfD
PfB
Dc
EeB
PdC
PdB
PbA
Ne
BpF
FrB
RoA
GaB
FsB
EnB
w


N
R. 2 E.
(Joins sheet 84)
(Joins sheet 92)
(Joins sheet 98)
T. 15 N.
MONROE COUNTY
ELROY
ELROY-SPARTA STATE TRAIL
FOWLER SHERMAN CEM
ST. PATRICKS CEM.
ELROY CEM.
Baraboo River
Mack Valley
Cleaver Creek
CHICAGO AND NORTHWESTERN
27
28
29
30
31
32
33
34
1 MILE
1 KILOMETER
Scale 1:15 840


N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
(Joins sheet 85)
(Joins sheet 99)
(Joins sheet 91)
(Joins sheet 93)
R. 2 E.
R. 3 E.
T. 15 N.
1 955 000 FEET
Mullin
Ridge
Onemile
Creek
25
26
27
30
31
34
35
36

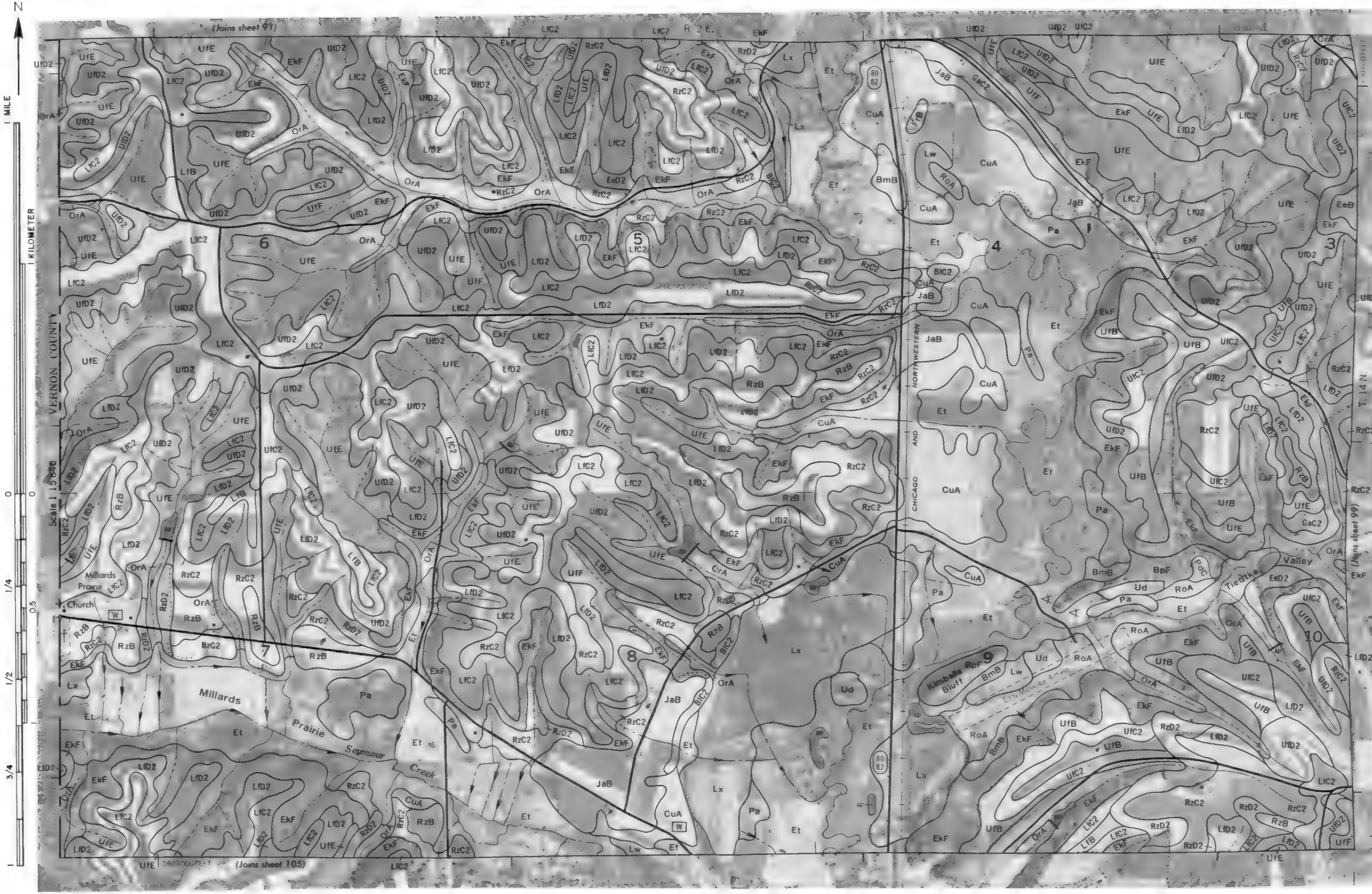

N
R. 3 E.
T. 15 N.
(Joins sheet 86)
(Joins sheet 94)
(Joins sheet 100)
(Joins sheet 92)
1 955 000 FEET
635 000 FEET
Riley Hollow
Onemile Creek
Stewart Creek
Steamboat Rock
ST ANNS CEM
26
27
28
29
32
33
34
35
1 MILE
1 KILOMETER
0
1/4
0.5
1/2
3/4
Scale 1:15 840

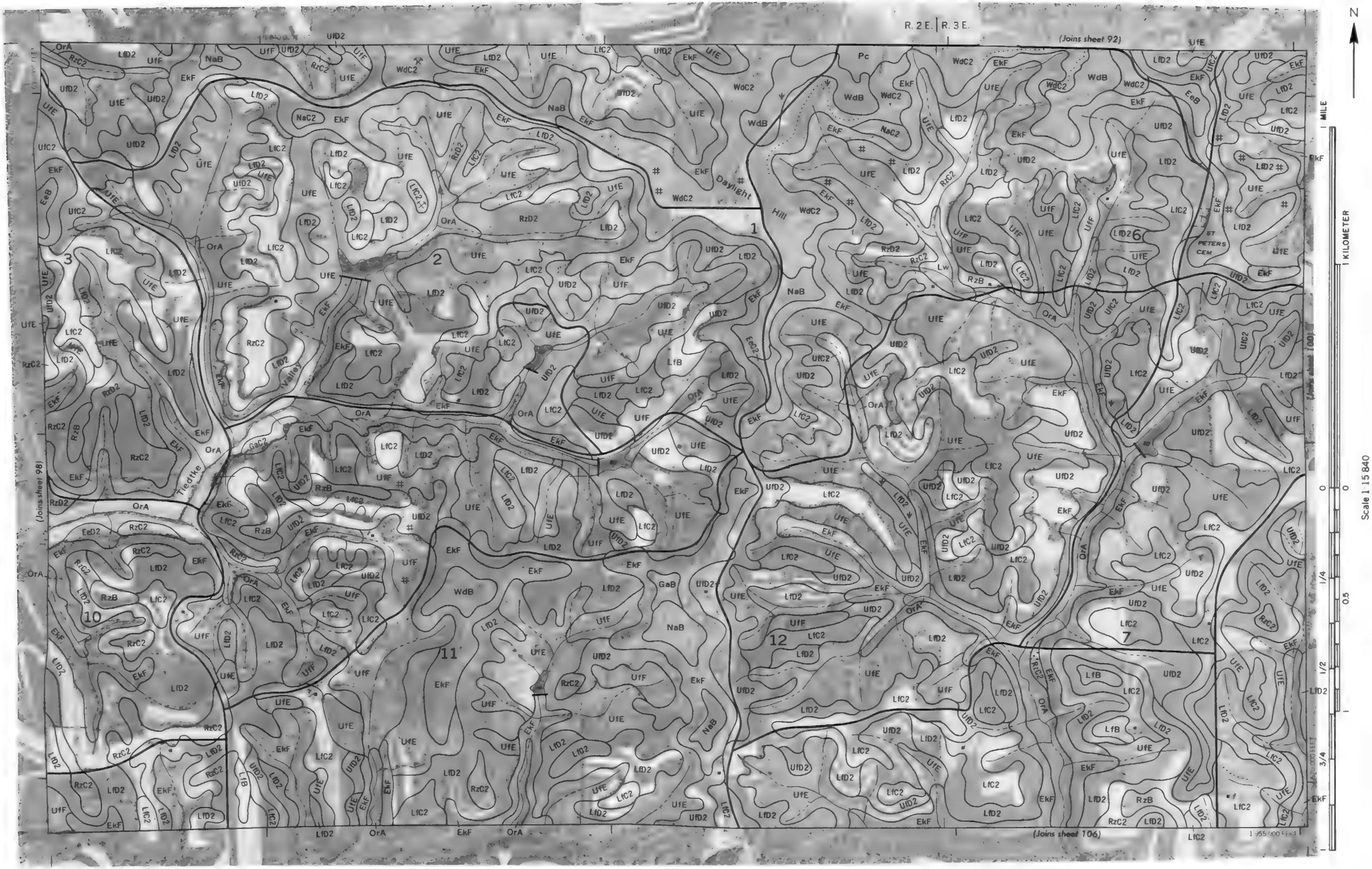

N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
(Joins sheet 87)
R 3 E | R 4 E
(Joins sheet 93)
(Joins sheet 95)
(Joins sheet 101)
T 15 N
26
25
30
29
35
36
31
32
Onemile Creek
Little Creek
Stewart Creek
Cattail Creek
CATTAIL VALLEY
Cattail Valley
EVERGREEN CEMETERY
1 075 000 FEET


95
N
R. 4 E.
(Joins sheet 88)
(Joins sheet 94)
(Joins sheet 96)
(Joins sheet 102)
T. 15 N.
Round Bluff
Sheep Pasture Bluff
Pollard Rock
Sevenmile Creek
CHICAGO MILWAUKEE ST PAUL AND PACIFIC
27
28
26
25
33
34
35
36
MILE
KILOMETER
Scale 1:15 840

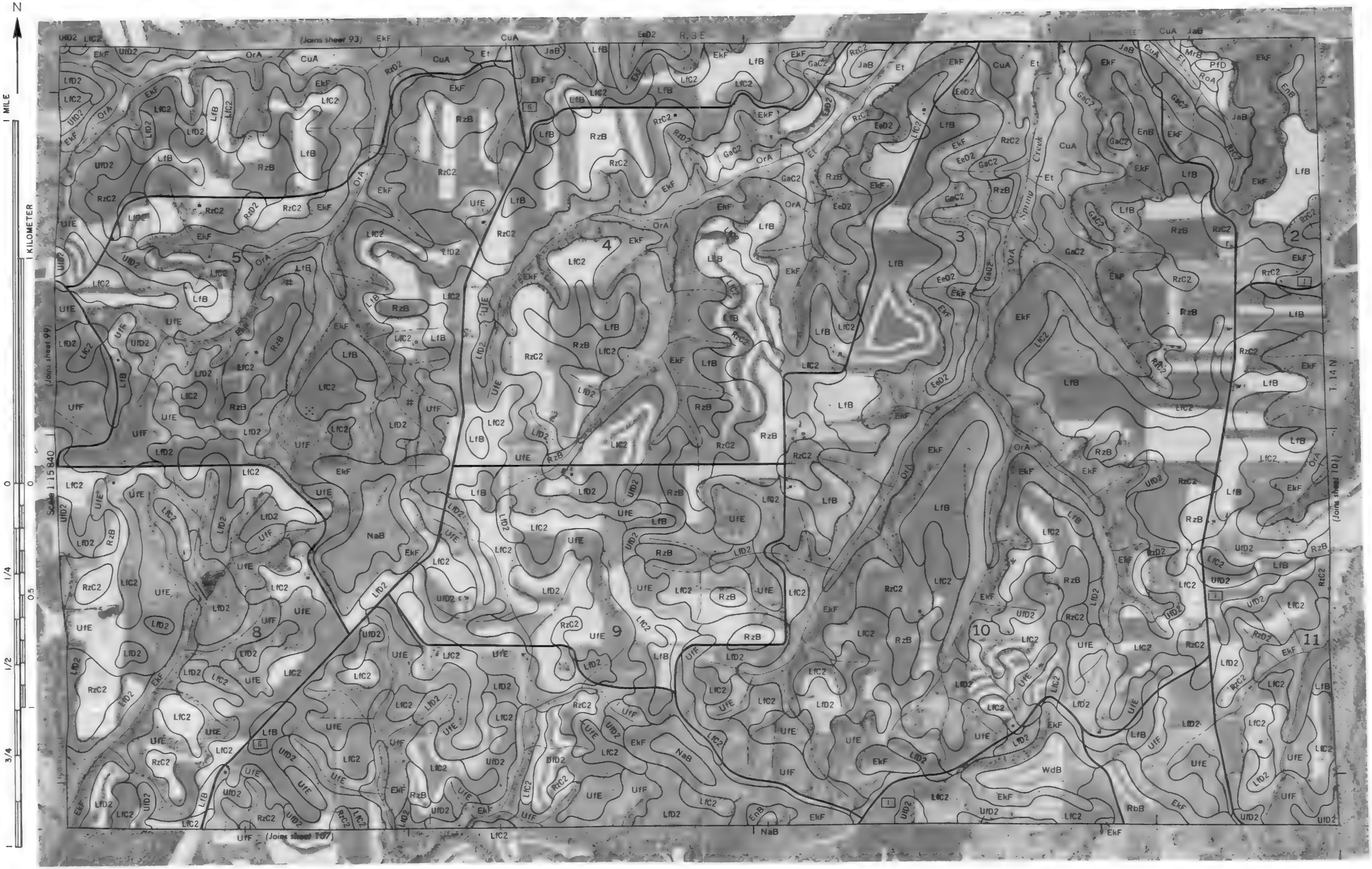

N
MILE
KILOMETER
0
1/4
1/2
3/4
1
0.5
Scale 1:15 840
R. 4 E. | R. 5 E.
(Joins sheet 89)
(Joins sheet 95)
(Joins sheet 97)
(Joins sheet 103)
T. 15 N.
25
30
29
28
36
31
32
33
CHICAGO MILWAUKEE ST PAUL AND PACIFIC
90 94

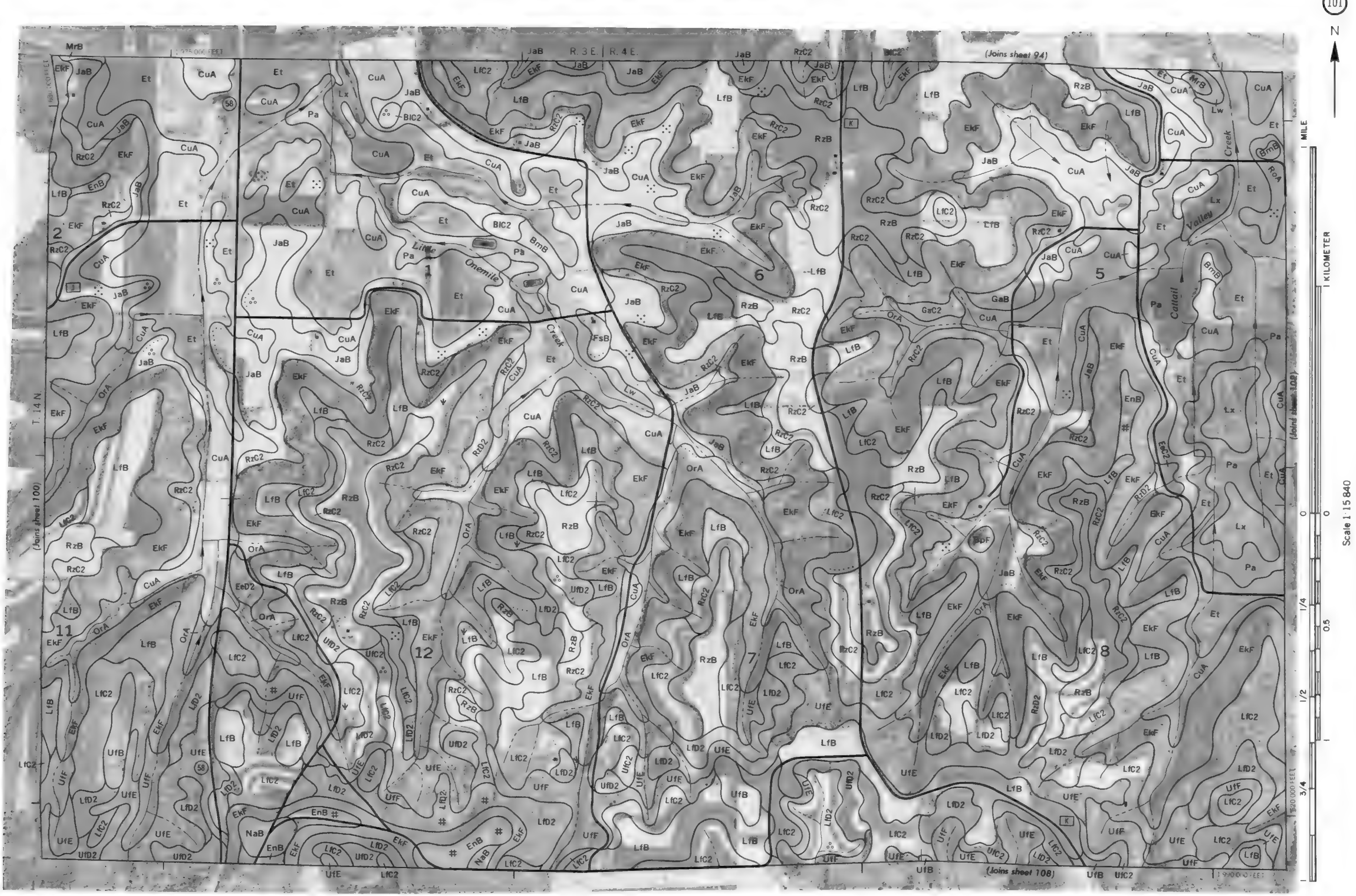

N
R. 5 E.
(Joins sheet 90)
T. 15 N.
(Joins sheet 96)
(Joins sheet 104)
27
26
25
34
35
36
Swandas Bluff
WISCONSIN RIVER
ADAMS COUNTY
MILE
1 KILOMETER
Scale 1:15 840


N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840
(Joins sheet 91)
R 2 E.
(Joins sheet 105)
(Joins sheet 99)
T. 14 N.
VERNON COUNTY
CHICAGO AND NORTHWESTERN
Millards Prairie Church
Millards Prairie
Seymour Creek
Kimballs Bluff
Tiedtke Valley
3
4
5
6
7
8
9
10
80
82
W


N
R. 2 E. | R. 3 E.
(Joins sheet 92)
(Joins sheet 98)
(Joins sheet 100)
(Joins sheet 106)
Daylight Hill
Tiedtke Valley
ST PETERS CEM
1 MILE
1 KILOMETER
Scale 1:15 840

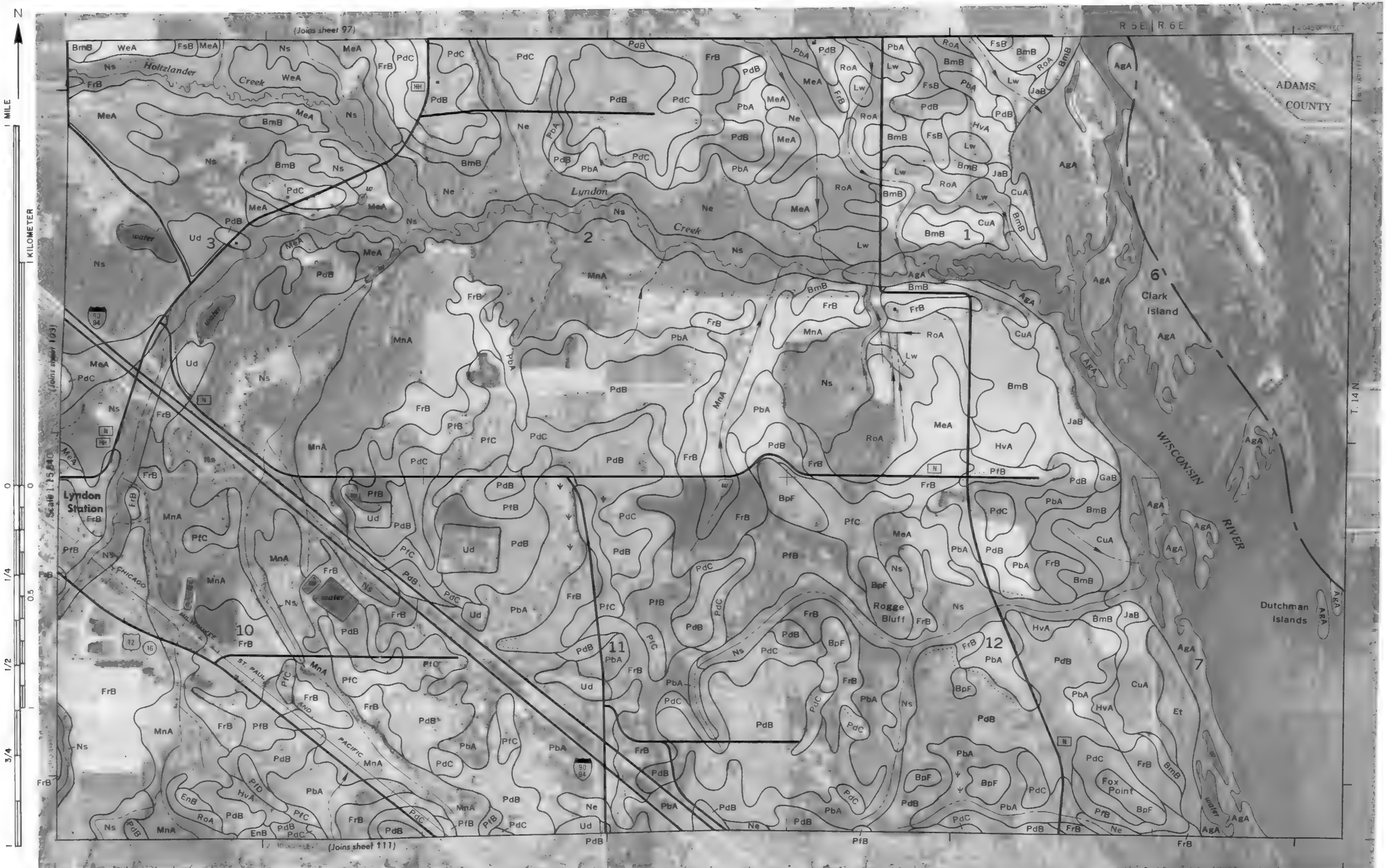
JUNEAU COUNTY, WISCONSIN — SHEET NUMBER 100




101
N
(Joins sheet 94)
(Joins sheet 100)
(Joins sheet 102)
(Joins sheet 108)
R. 3 E. | R. 4 E.
T. 14 N.
Little Onemile Creek
Cattail Valley Creek
1 MILE
1 KILOMETER
Scale 1:15 840


N
1 MILE
1 KILOMETER
Scale 1:15 840
(Joins sheet 95)
(Joins sheet 101)
(Joins sheet 103)
(Joins sheet 109)
R. 4 E.
T. 14 N.
Sevenmile Creek
Fairy Bluff
Pine Knob
1
2
3
4
9
10
11
12


(Joins sheet 96)
(Joins sheet 110)
(Joins sheet 102)
(Joins sheet 104)
R. 4 E.
R. 5 E.
T. 14 N.
Holtzlander Creek
Tracy Creek
Lyndon Creek
CHICAGO MILWAUKEE ST PAUL AND PACIFIC
Lyndon Station
LYNDON CEMETERY
ST MARYS CEMETERY
N
1 MILE
1 KILOMETER
Scale 1:15 840

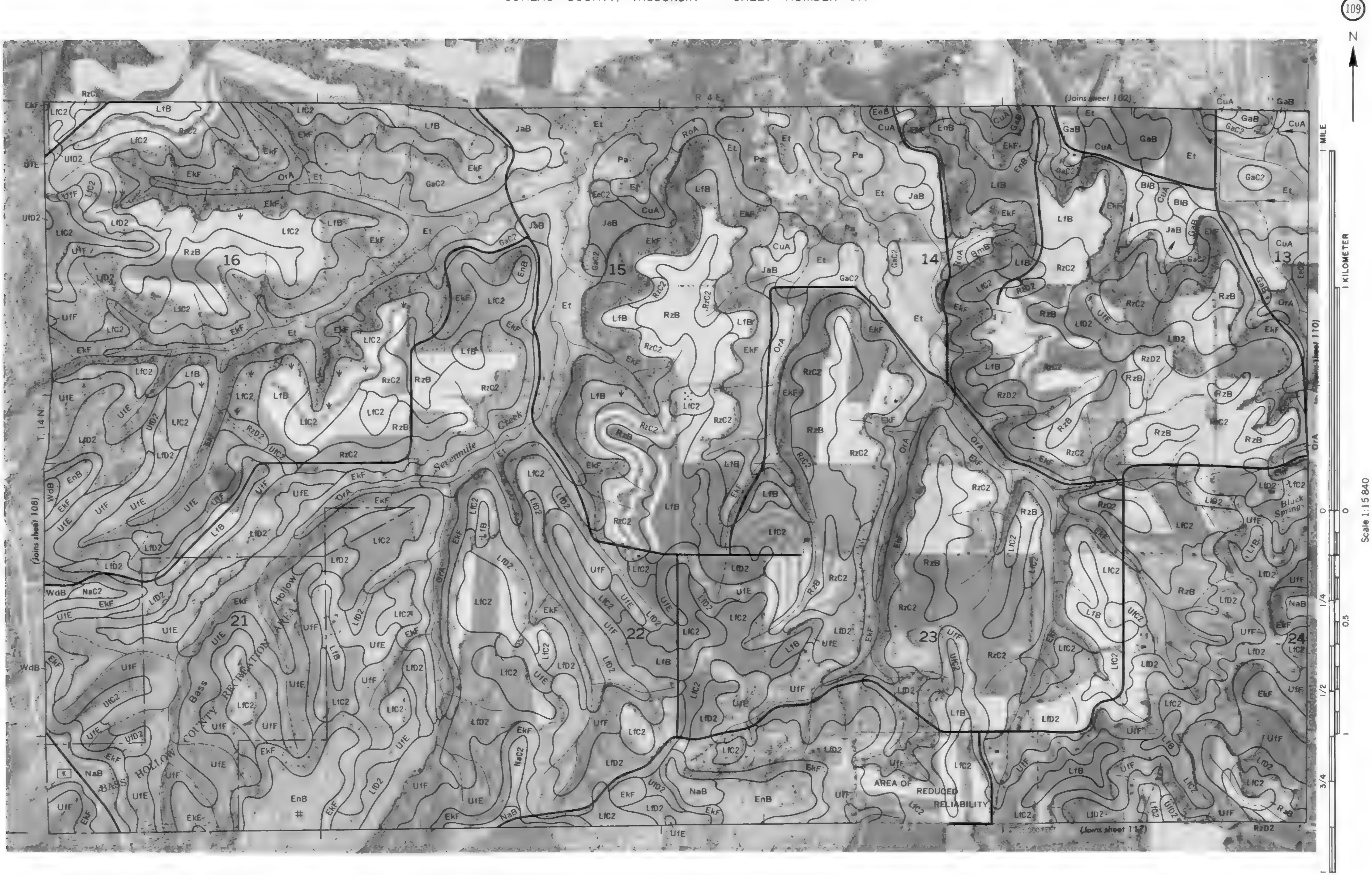

N
(Joins sheet 97)
(Joins sheet 103)
(Joins sheet 111)
R 5 E. | R 6 E.
T. 14 N.
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
ADAMS
COUNTY
Holtzlander
Creek
Lyndon
Creek
Lyndon
Station
Clark
Island
WISCONSIN
RIVER
Rogge
Bluff
Dutchman
Islands
Fox
Point
CHICAGO
MILWAUKEE
ST. PAUL
AND
PACIFIC
water
1
2
3
6
7
10
11
12


N
(Joins sheet 98)
(Joins sheet 106)
(Joins sheet 113)
R. 2 E.
T. 14 N.
VERNON COUNTY
Union Center
Seymour Creek
Baraboo River
West Branch Baraboo River
Hill Creek
CHICAGO AND NORTHWESTERN
HILLSBORO AND NORTHEASTERN
ST. THERESA CEM
15
16
17
18
19
20
21
22
MILE
KILOMETER
Scale 1:15 840

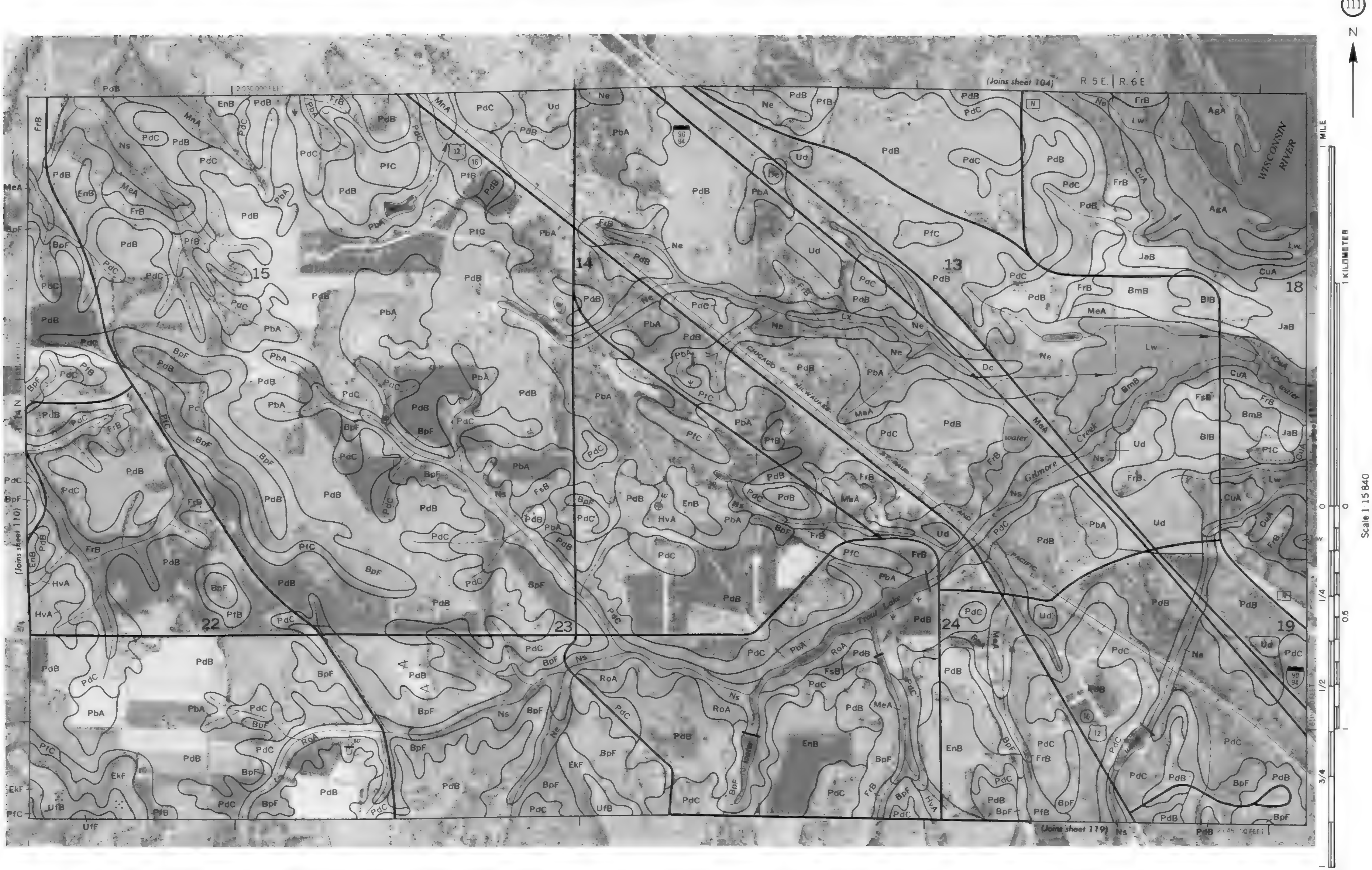

N
(Joins sheet 99)
(Joins sheet 105)
(Joins sheet 107)
(Joins sheet 114)
R. 2 E. | R. 3 E.
T. 14 N.
Pleasant Ridge
Crossman Creek
Gordner Creek
RAESE CEM
Three Castles Landing Strip
Scale 1:15 840
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5

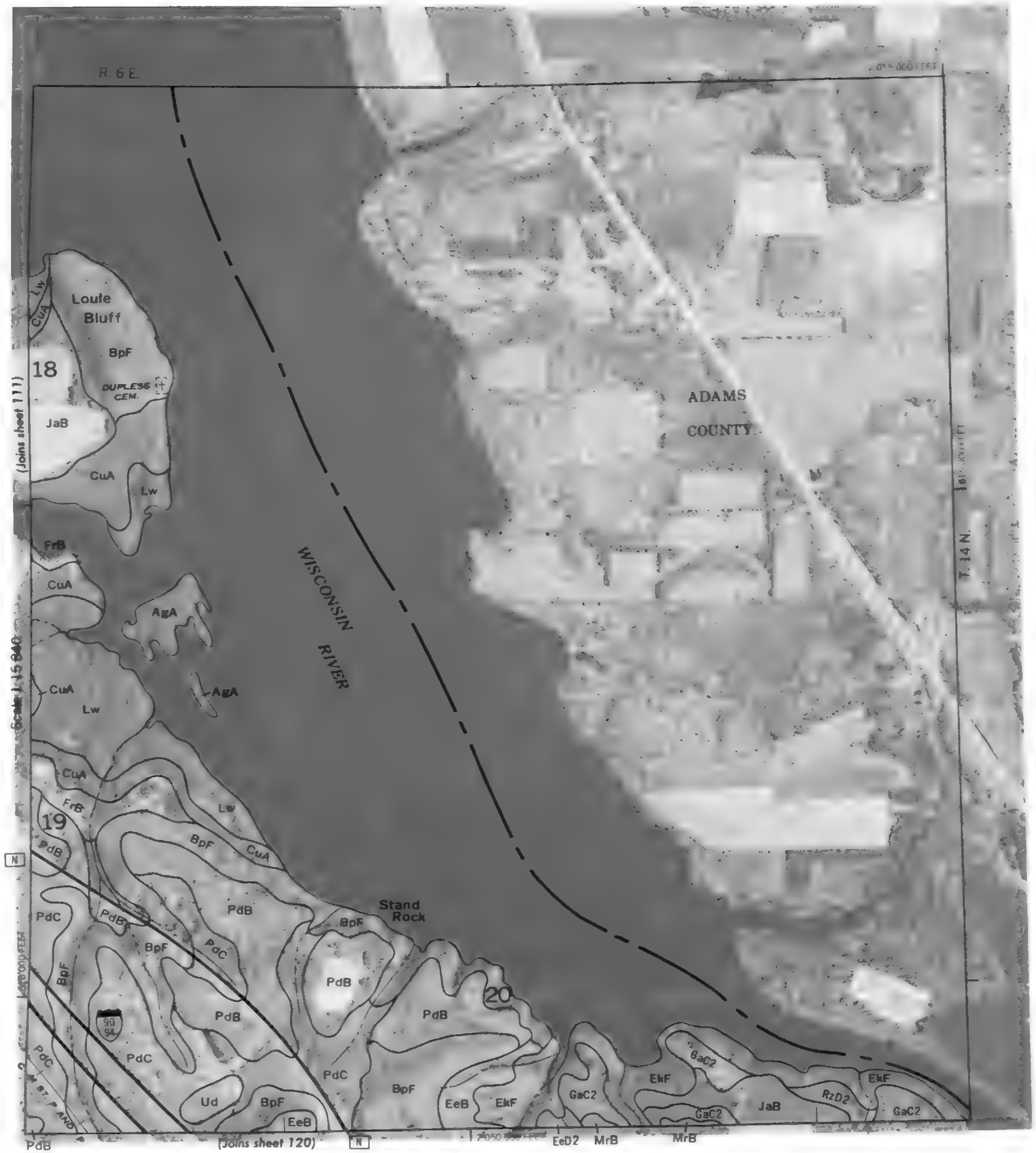

107
N
R. 3 E.
(Joins sheet 100)
(Joins sheet 106)
(Joins sheet 108)
(Joins sheet 115)
T. 14 N.
14
15
16
17
20
21
22
23
Crossman Creek
MILE
1 KILOMETER
Scale 1:15 840

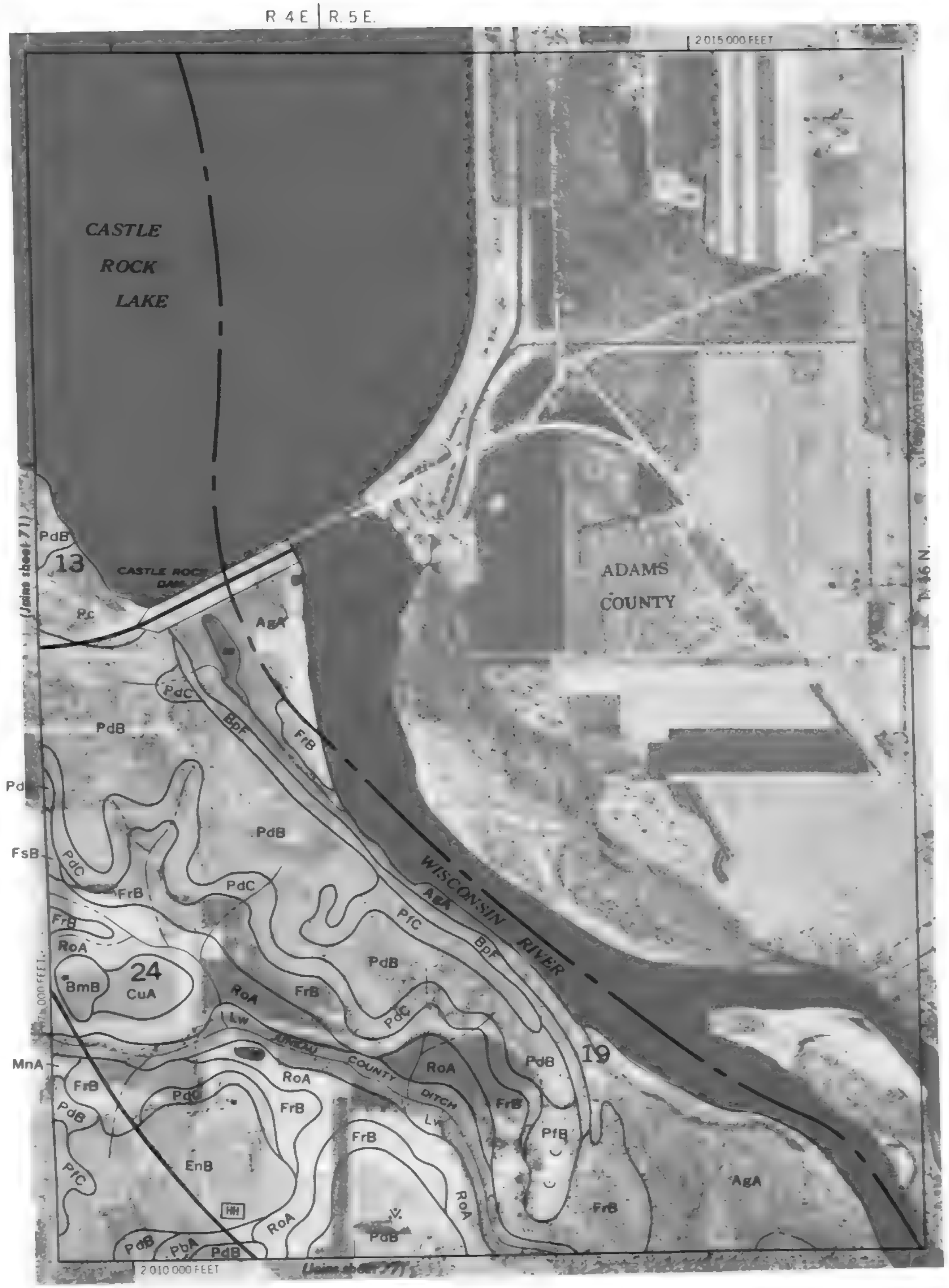

N
1 MILE
1 KILOMETER
0
1/4
0.5
1/2
3/4
Scale 1:15 840
(Joins sheet 101)
(Joins sheet 107)
(Joins sheet 109)
(Joins sheet 116)
R. 3 E.
R. 4 E.
T. 14 N.
13
14
17
18
19
20
23
24
BARNEY CEM
water
Potato Hill
West Branch Big Creek


109
N
(Joins sheet 102)
(Joins sheet 108)
(Joins sheet 110)
(Joins sheet 117)
R 4 E
T. 14 N.
16
15
14
13
21
22
23
24
Sevenmile Creek
Bass Hollow
BASS HOLLOW COUNTY RECREATION AREA
Black Spring
AREA OF REDUCED RELIABILITY
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
0.5
1/2
3/4

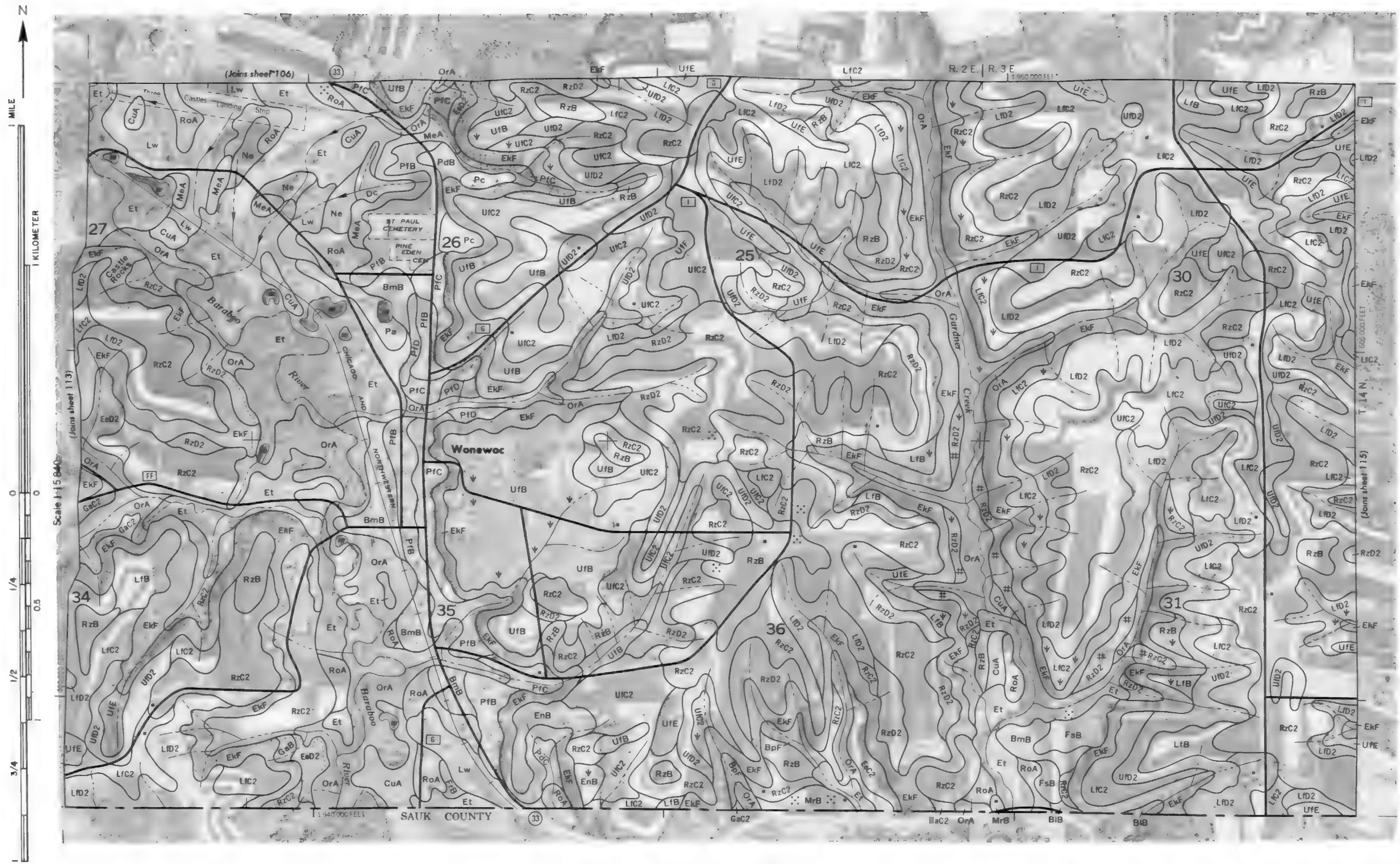

N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
R. 4 E.
R. 5 E.
(Joins sheet 103)
(Joins sheet 109)
(Joins sheet 111)
(Joins sheet 118)
T. 14 N.
Tracy Creek
Lyndon Creek
Fitz Bluff
Moran Bluff
13
16
17
18
19
20
21
24


111
N
(Joins sheet 104)
R. 5 E. | R. 6 E.
WISCONSIN RIVER
(Joins sheet 110)
(Joins sheet 119)
T. 14 N.
15
14
13
18
22
23
24
19
CHICAGO MILWAUKEE ST. PAUL AND PACIFIC
Gilmore Creek
Trout Lake
water
MILE
KILOMETER
Scale 1:15 840


N
1 MILE
1 KILOMETER
Scale 1:15 840
R. 6 E.
Loule Bluff
18
BpF
DUPLESS CEM.
JaB
CuA
Lw
(Joins sheet 111)
FrB
AgA
WISCONSIN RIVER
ADAMS COUNTY
T. 14 N.
19
PdB
PdC
BpF
Stand Rock
20
Ud
EeB
EkF
GaC2
JaB
RzD2
(Joins sheet 120)
EeD2
MrB


R. 4 E. | R. 5 E.
2 015 000 FEET
CASTLE ROCK LAKE
CASTLE ROCK DAM
13
PdB
Pc
(Joins sheet 71)
AgA
PdC
BpF
FrB
FsB
ADAMS COUNTY
T. 16 N.
WISCONSIN RIVER
24
BmB
CuA
RoA
Lw
JUNEAU COUNTY DITCH
MnA
PfC
PfB
19
EnB
HH
2 010 000 FEET
(Joins sheet 77)


N
(Joins sheet 105)
R. 2 E.
T. 14 N.
(Joins sheet 114)
VERNON COUNTY
SAUK COUNTY
West Branch Baraboo River
27
28
29
30
31
32
33
34
1 MILE
1 KILOMETER
Scale 1:15 840

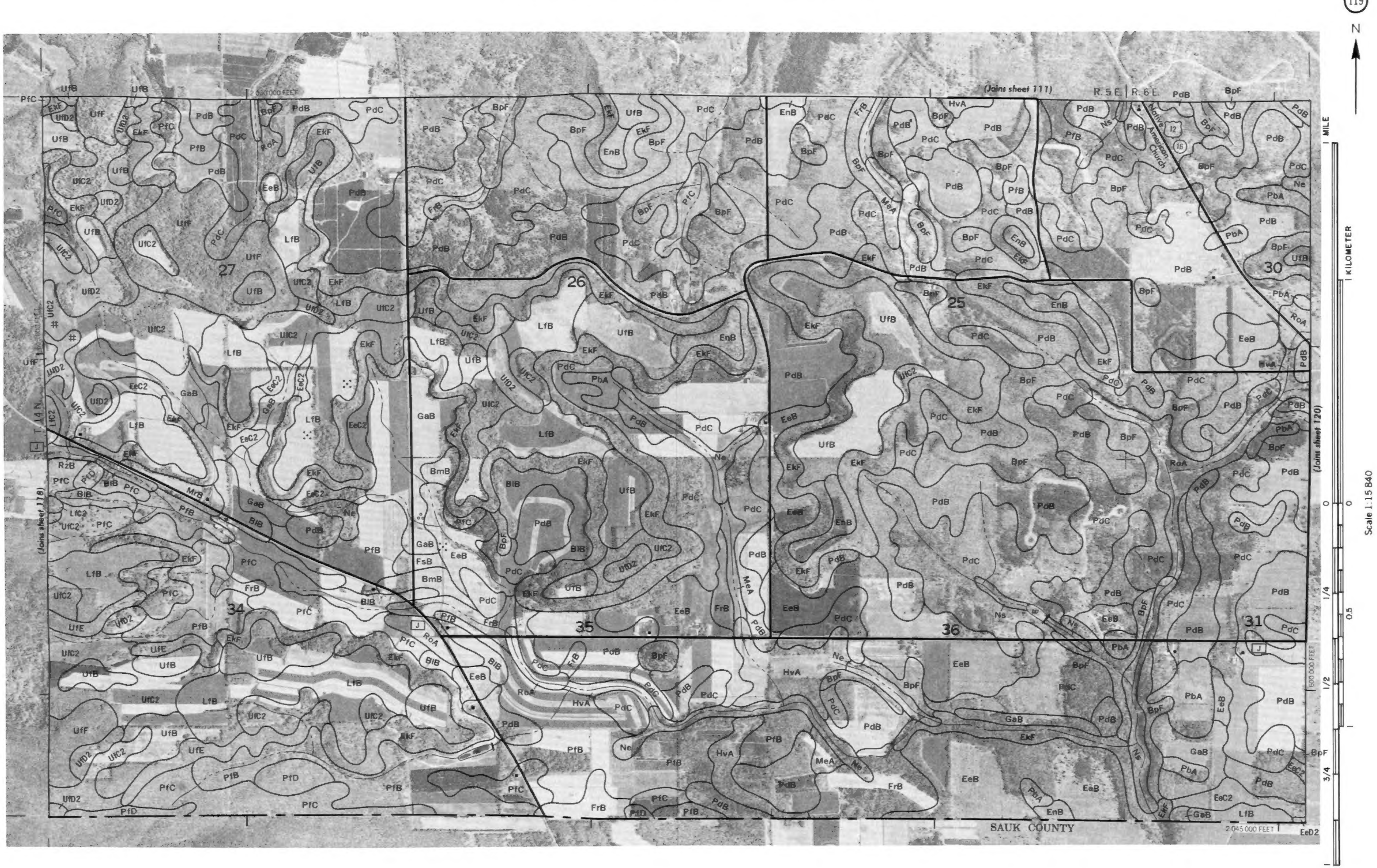

N
1 MILE
1 KILOMETER
0
1/4
0.5
1/2
3/4
Scale 1:15 840
(Joins sheet 106)
(Joins sheet 113)
(Joins sheet 115)
R. 2 E. | R. 3 E.
T. 14 N.
1 950 000 FEET
1 940 000 FEET
Three Castles Landing Strip
ST. PAUL CEMETERY
PINE EDEN CEM
Castle Rocks
Baraboo River
CHICAGO AND NORTHWESTERN
Wonewoc
Gardner Creek
Baraboo River
SAUK COUNTY
27
26
25
30
34
35
36
31

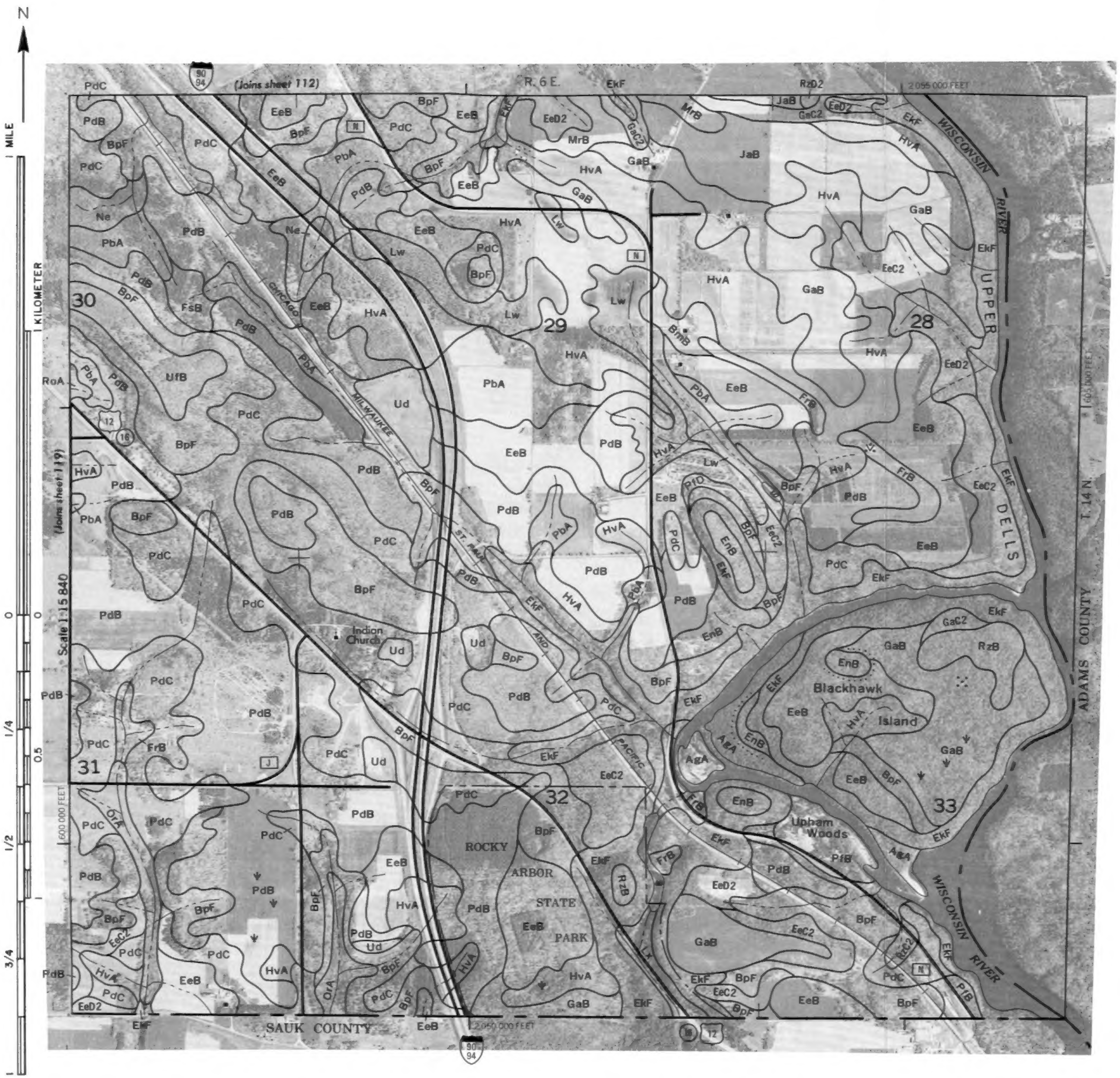

115
N
R. 3 E.
(Joins sheet 107)
T. 14 N.
(Joins sheet 114)
(Joins sheet 116)
Potter
Ridge
POTTER CEMETERY
Crossman
Creek
SAUK COUNTY
26
27
28
29
32
33
34
35
58
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5

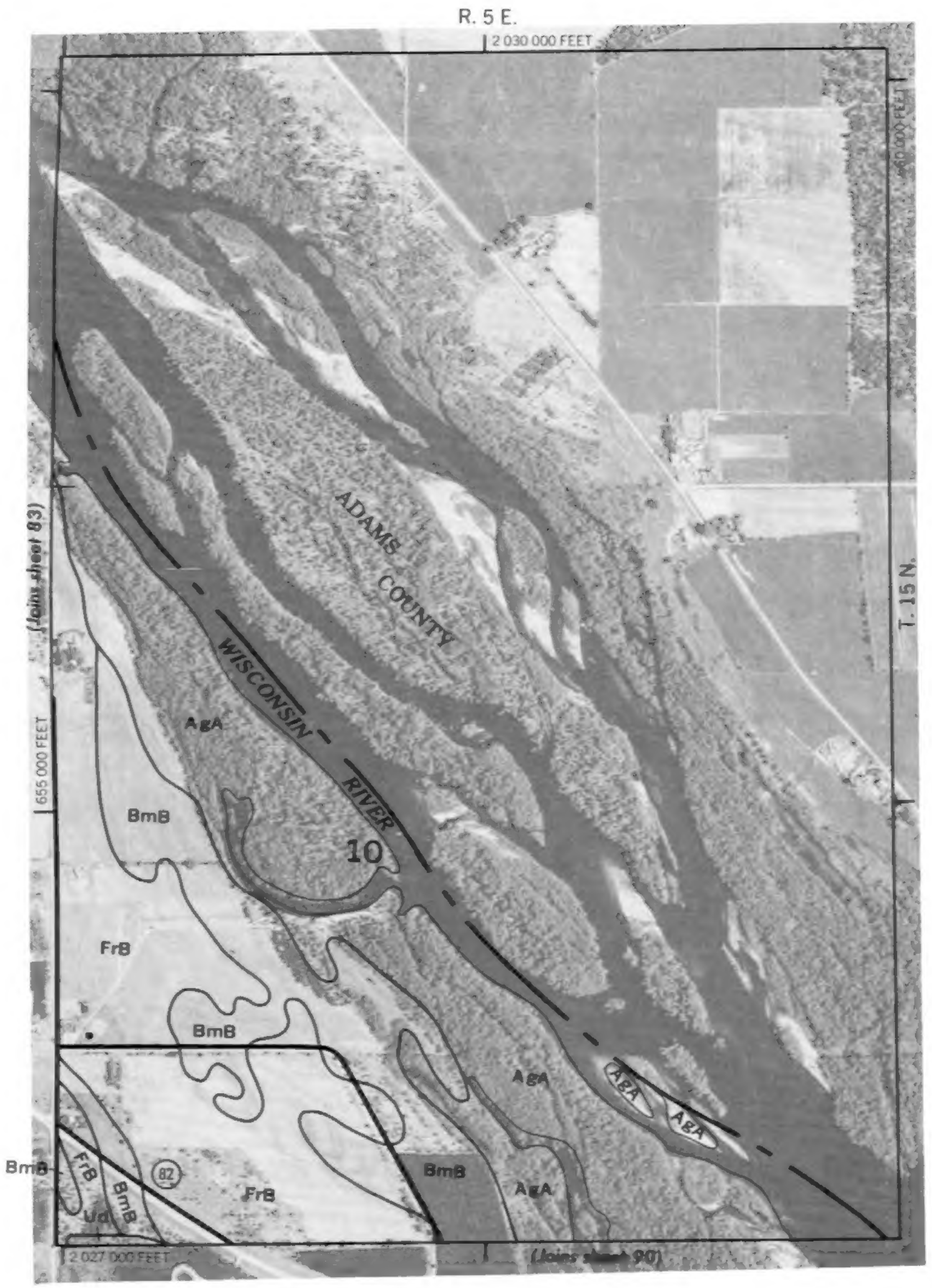

N
MILE
KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840
(Joins sheet 108)
R. 3 E.
R. 4 E.
1 990 000 FEET
(Joins sheet 113)
(Joins sheet 117)
T. 14 N.
600 000 FEET
1 975 000 FEET
SAUK COUNTY
26
25
30
29
35
36
31
32
West Branch Big Creek
East Branch Big Creek
water
Pc


117
N
R. 4 E.
(Joins sheet 109)
1 995 000 FEET
T. 14 N.
(Joins sheet 116)
(Joins sheet 118)
AREA OF
REDUCED
RELIABILITY
28
27
26
25
33
34
35
36
East Branch
Big Creek
Dell Creek
SAUK COUNTY
2 005 000 FEET
600 000 FEET
1 MILE
1 KILOMETER
Scale 1:15 840


N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5
R. 4 E. | R. 5 E.
(Joins sheet 110)
(Joins sheet 117)
(Joins sheet 119)
T. 14 N.
2 025 000 FEET
2 010 000 FEET
605 000 FEET
600 000 FEET
Bald
Knob
AREA
OF
REDUCED
RELIABILITY
Grubb
Hill
Dell
Creek
DELL
CREEK
STATE
WILDLIFE
AREA
SAUK COUNTY
25
29
30
28
31
32
33
36
HH
J


119
N
(Joins sheet 111)
R. 5 E. R. 6 E.
Native American Church
(Joins sheet 118)
(Joins sheet 120)
T. 14 N.
27
26
25
30
34
35
36
31
SAUK COUNTY
2 350 000 FEET
2 045 000 FEET
500 000 FEET
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5





3000 AND 5000-FOOT GRID TICKS